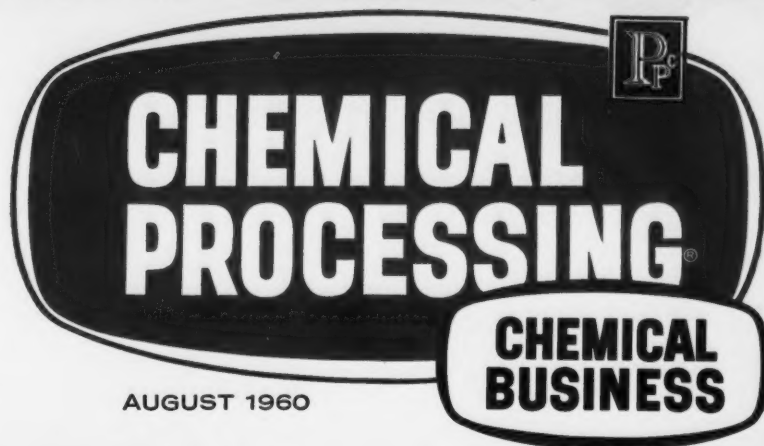


Enjoy Plunges Ahead In Plastics

Polypropylene under intensive market development; tailored polymers ahead page 30

Ball Valve Sales Surge In CPI

Unique combination of features earning resounding acceptance in field page 34



AUGUST 1960

they all spell COMPETITION

FOR U.S. CHEMICAL INDUSTRY ABROAD

Foreign technology and management challenge U.S. bid for foreign markets page 23

LOWER FOREIGN DUTIES
asked by chemical producers page 27

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"Executive Magazines for Industry"

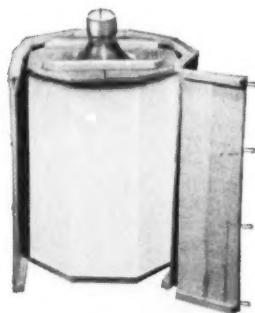
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Coming soon from General Chemical!



New Acid-Bottle Protection

Underneath the rugged, wire-bound wooden outer shell, inch-thick, foamed-in-place expanded polystyrene protects General Chemical's 13-gallon acid bottle.



Basic to America's Progress



NEW, Safer, Lighter, Smaller 13-Gallon Acid Carboy

**cushioned with expanded
polystyrene overpack**

General Chemical packaging research has done it again! This time with a new carboy for 13-gallon acid bottles that has just won the 1960 "Best of Show" award from the Society of Packaging and Handling Engineers. Here is a commercial acid carboy that cushions the bottle completely with foamed-in-place expanded polystyrene . . . also has the added protection of an octagonal wire-bound wooden shell. Look at these outstanding advantages:

- ✓ **Safer!** New expanded polystyrene overpack resists shock . . . cushions bottle in shipping and handling.
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- ✓ **Smaller!** Increases shipping and storage capacity by 30-35%.

This revolutionary new 13-gallon acid carboy is now going into expanded production and will be available soon from most production and stock points. Call your nearest General Chemical office for full details and information on availability in your area.

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.



conventions
and exhibits

Aug. 14-17. American Institute of Chemical Engineers 4th National Heat Transfer conference, Statler Hotel, Buffalo, New York.

Aug. 29-31. Water Quality Measurement and Instrumentation symposium, Hotel Sinton, Cincinnati, Ohio.

Sept. 6-16. The Production Engineering Show, Navy Pier, and the Machine Tool Show, International Amphitheatre, Chicago.

Sept. 13-15. Chemical Exposition U.S.A., Statler Hilton Hotel, New York City — concurrently with the 138th national meeting of the American Chemical Society, Sept. 11-16.

Sept. 22-23. Chemical Market Research Association, Wentworth-By-The-Sea, Portsmouth, N. H.

Sept. 25-28. American Institute of Chemical Engineers, Mayo Hotel, Tulsa, Okla.

Sept. 26-30. Instrument Society of America, Instrument-Automation conference and exhibit, Coliseum, New York.

Oct. 6-7. Western Conference, National Association of Corrosion Engineers, San Francisco, Calif.

Oct. 6-8. Southeast Conference, National Association of Corrosion Engineers, Atlanta, Ga.

Oct. 9-13. The Electrochemical Society, meeting, Shamrock Hotel, Houston.

Oct. 11-14. Northeast Conference, National Association of Corrosion Engineers, Huntington, W. Va.

Oct. 12-14. The American Vacuum Society, 7th National symposium, Cleveland-Sheraton Hotel, Cleveland, Ohio.

Oct. 12-13-14. Combined meeting of the fourth conference on Analytical Chemistry in Nuclear Reactor Technology and the first conference on Nuclear Reactor Chemistry, Gatlinburg, Tenn.

... Meetings and shows of interest to the chemical industries

Oct. 17-18. American Coke and Coal Chemicals Institute, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 17-19. Technical Association of the Pulp and Paper Industry, Plastics-Paper conference, Hotel Syracuse, Syracuse, N. Y.

Oct. 17-19. Fall Meeting of the American Oil Chemists' Society, Hotel New Yorker, New York City.

Oct. 17-21. 42nd National Metal Congress & Exposition, American Society for Metals, Trade and Convention Center, Philadelphia.

Oct. 19-20. North Central Conference, National Association of Corrosion Engineers, Milwaukee, Wis.

Oct. 25-27. South Central Conference, National Association of Corrosion Engineers, Tulsa, Okla.

Oct. 29-Nov. 2. 25th Paint Industries Show, Chicago, Ill.

Oct. 30-Nov. 2. Federation of Societies for Paint Technology, 38th annual meeting, Sherman Hotel, Chicago, Ill.

Oct. 31-Nov. 2. The 22nd Annual National Packaging Forum, Packaging Institute, Statler-Hilton Hotel, New York City.

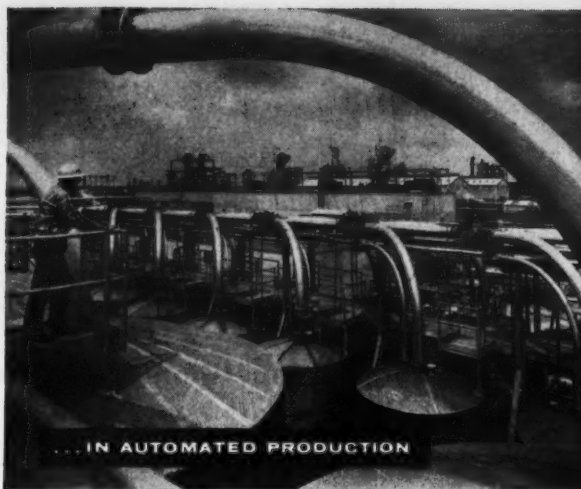
Nov. 9-10. Chemical Market Research Association, Pittsburgh Hilton Hotel, Pittsburgh, Pa.

Nov. 28-Dec. 2. The 24th National Exposition of Power & Mechanical Engineering, Coliseum, New York.

Dec. 3-9. Chemical Specialties Manufacturers Association, 47th annual meeting, Hollywood Beach Hotel, Hollywood, Fla.

Dec. 4-7. American Institute of Chemical Engineers, Statler Hotel, Washington, D. C.

Dec. 8. Annual Meeting of the Synthetic Organic Chemical Manufacturers Association, Hotel Roosevelt, New York.



... IN MEDIUM-SIZED OPERATIONS

Airstream Conveyor Systems automatically handle polyethylene throughout all phases of production — drying, extruding, pelletizing, storage and bagging — at Phillips Chemical Co., Pasadena, Texas. High-volume, high-purity Dracco systems like this are used by most major plastics producers.

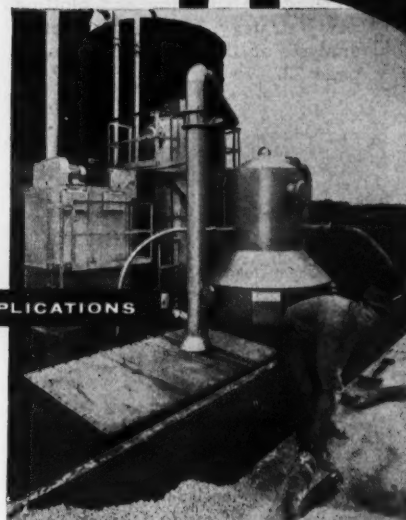
Typical unloading-to-storage-to-process systems, like this one at St. Louis feed supplement plant of Merck & Co., enable bulk materials users to take best advantage of other modern production techniques and equipment. Such systems are easily expanded, with minimum engineering cost, when handling requirements increase.

*Dracco experience gives you
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... IN ADVANCED PROCESSING

Automatic in-plant materials distribution with Airstream Conveyors enables Western Electric Co. to apply new cable insulating and sheathing methods at Point Breeze Works, Baltimore. Systems carry 11 different colors of polyethylene pellets over distances up to 700 feet, supplying 50 extruding machines without contamination or intermixing.



... IN SMALL-QUANTITY APPLICATIONS

Airstream Conveyors prove economical in handling quantities as small as one carload a month, or the equivalent. This low-cost, ground-level system at a mid-western processing plant is used only periodically to unload lime from trucks to storage, yet provides important savings in materials and labor costs.

Whether your dry materials handling requirements are large or small, simple or complex, it pays to install an air conveyor engineered by experienced specialists. To be sure you get the system best suited to your application, contact: Dracco Division of Fuller Co., Harvard Avenue and East 116th Street, Cleveland 5, Ohio.

DRACCO airstream conveyors
dust control equipment



Check 3638 opposite last page.

THIS MONTH'S COVER

Since World War Two, from which it emerged a robust youngster to inherit almost by default the world's chemical markets, the U.S. chemical industry and engineering-construction industry have had smooth sailing (selling) in global commerce. We use "have had" advisedly, for today many of these markets are being reclaimed by resurgent native industries. And their salesmen are out-matching our business acumen and technology in the struggle for the remaining markets. Harassed abroad and facing similar prospects at home, many CPI leaders are reviewing the situation and plotting new strategy. For interpretive analysis of the situation, turn to page 23.

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Special This Month

23 Rising foreign competition threatens U.S. CPI

Our world chemical leadership challenged by resurgent management, technology abroad

27 Pressure mounts for lower tariffs

Chemical producers seek cuts in foreign duties, open door for reciprocal U.S. reductions

30 Enjoy girds for stronger push in plastics

Polypropylene now under intensive market development, custom-tailored polymers are on horizon

34 'Cinderella' ball valves strike it rich in CPI

Spotlighted first by use in missiles, sales to industry rocket from \$5 to \$20 million in yr

38 Brine filtration goes semi-automatic

Downtime slashed 95%, maintenance costs \$2000 yr less for polishing system

57 Polyox, now commercial, vies for top billing

Only water-soluble synthetic thermoplastic, it proves worthy performer in market tests

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over the editor's
shoulder



U.S. ahead abroad, but—

When I first began talking with chemical industry leaders about building new plants abroad (see page 23) this seemed like just another type of diversification. A company wondering what next to do with its techniques, talents and money might simply decide to manufacture a regular product abroad in a likely market area.

Three weeks and more than a dozen rather long interviews have given me quite a different view of the situation. For one thing, I am quite frankly startled that most everyone readily concedes that our position of "being ahead" technologically or managerially is rapidly shrinking. Rapid development abroad of able individuals and teams has seriously shrunk our advantages.

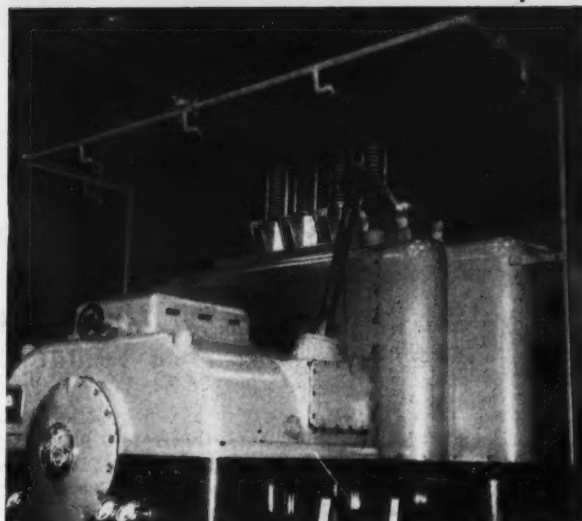
Thus the world situation our chemical industry faces is not an easy one, either abroad or at home; although tremendous opportunities still exist.

It is heartening to find many of our companies taking this matter in stride, frequently with noteworthy results.

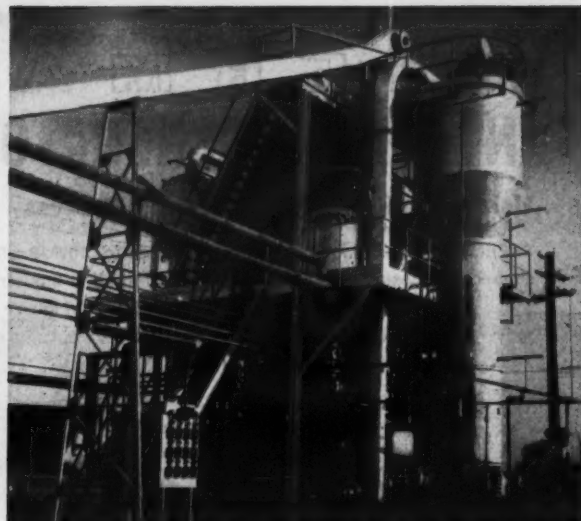
The problem is one that I sincerely believe should concern all of us, at least to the degree of knowing what is going on, and what support our companies need—both from the government and stockholders—in accomplishing the job ahead.

John B. Mellecker

John B. Mellecker, Editor
Industry Planning and Research



At Pennsylvania Power and Light Company, Sunbury, Pa., this steam generator is protected by an automatic Grinnell ProtectoSpray system in the event of outside fires and by a Dry Chemical system inside the casing.



At Canadian Vegetable Oil Processing Ltd., Hamilton, Ontario, Grinnell ProtectoSpray safeguards upper structure of this hexane solvent extraction unit, while a ProtectoFoam system guards the lower section.



At the RCAF supply depot at Namao, Alberta, this infrared drying oven is protected by a Dry Chemical system engineered by Grinnell to protect against possible fire resulting from ignition of flammable vapor mixtures.



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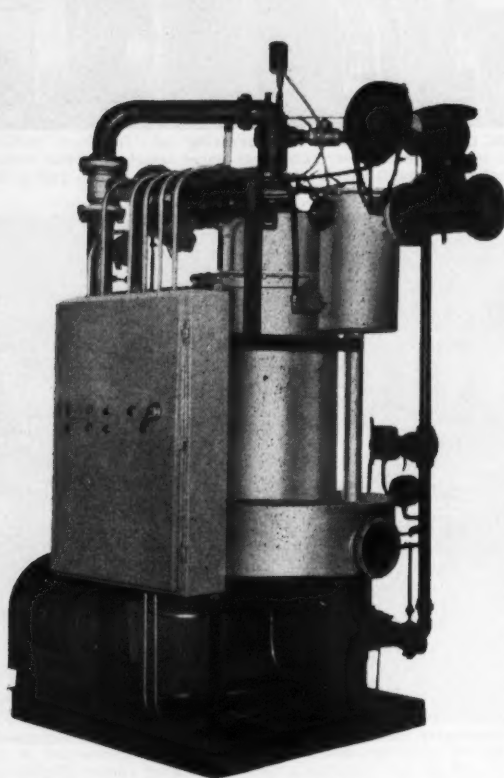


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Check 3640 opposite last page.



August 1960

Volume 23 • Number 8

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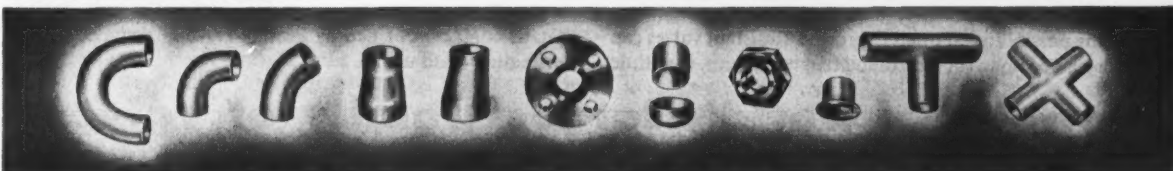
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Check 3641 opposite last page.

POWELL CORROSION-RESISTANT VALVES

Performance makes the world of difference

Fig. 2474BSW—Bell-o-Seal (Packless) O.S. & Y. Globe Valve for 150 pounds W.P. Available in various corrosion-resisting metals and alloys. Can be furnished with screwed, flanged, socket welding or butt welding ends.



Fig. 2345—Stainless Steel, screwed end Swing Check Valve for 300 pounds W.P. Available also with flanged or socket welding ends. Face to face and end flange dimensions of flanged end valves conform to latest standards.

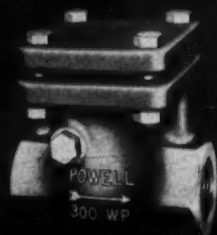
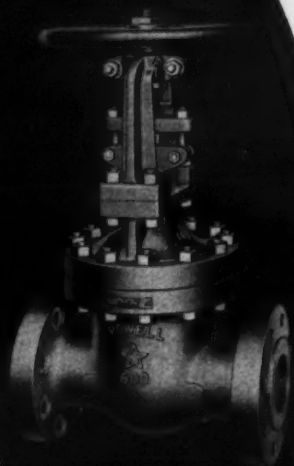


Fig. 6003SS—Large Stainless Steel Gate Valve for 600 pounds W.P. Face to face and end flange dimensions conform to latest standards. Sizes $\frac{1}{2}$ " to 24", inclusive.



Powell pure metal and special alloy valves have long been recognized by the Chemical and Process Industries as leaders in the field of corrosion-resistant flow control equipment.

The result of painstaking research; years of experience in modern foundry practice, pattern limitations, and machining possibilities, Powell Corrosion-Resistant valves can be depended upon for long uninterrupted service, with little

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**CHEM-
TRENDS** / Our Growing
Industry

Series of inter-corporate deals lead to sales, joint ventures

Evidence of considerable inter-corporate wheeling and dealing is mounting with outburst of announcements of joint ventures and acquisitions.

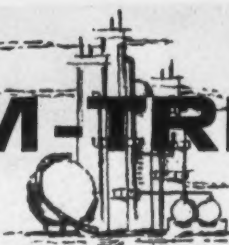
One of the biggest deals to be disclosed is that of **The Borden Co.** and **United States Rubber Co.** who have outlined a program to erect a \$50 million complex of chemical plants for converting hydrocarbons into more than a dozen chemical products. **Monochem, Inc.**, jointly-owned offspring, will build major unit (capacity 80 million lb/yr acetylene and 150 million lb/yr of vinyl chloride monomer) at site in either Louisiana or Texas. Actual construction is to start later this year—Completion date 1962 — with parent companies planning adjacent plants to use output.

A Dixon Chemical & Research, Inc. subsidiary (unidentified) gets 100,000 shares of **D. Kaltman & Co., Inc.** stock and option to buy 500,000 more at \$6.50 each within three years in return for \$500,000 cash and the parent company's supplying of advisory and consulting services to the drug-pharmaceutical distributor.

Acquisitions have been announced by **Columbian Carbon Company**—purchase of **Ander Chemical Company** for between \$2.5 and \$3 million; **Reichhold Chemicals, Inc.**—third recent purchase, that of **Deeey Products Company**, plasticizers maker; **Celanese Corporation of America**—absorption of **Plastics Horizons, Inc.**, intact into its polyethylene film operation; **Spencer**

To page 10

CHEMICAL PROCESSING



Briefs

▶ A second large-scale thermal-compression evaporator has been put onstream by Lignosol Chemicals at the recently expanded Quebec City plant. Rising 38 ft in height, the evaporator is said to be the largest of its kind for evaporating spent sulfite liquor. Supplied by The Bowen Corporation, the unit is of long-tube type, of stainless steel, and uses a steam-driven turbo-compressor. Seventy-five tons/day of calcium lignosulfonate in 10 percent concentration is evaporated to 50 percent solids content.

▶ FDA is not attempting to consolidate petitions concerning the same food additives, said FDA's J. W. Kirk before Chem. Specialties Mfrs. Assn. In effect, it is up to industry people to get together with others interested in a given compound, said Kirk. The FDA will, however, advise inquirers whether a petition has been filed.

▶ New labelling laws pertaining to hazardous chemicals do not demand details of ultimate effect, only "affirmative statement of principal hazard or hazards such as 'absorbed through skin,'" advised J. H. Foulger, consultant, at same meeting. He cautioned against all-out animal toxicity experiments, as equally important factors are hazard of material getting into body, amount likely to enter.

▶ Japan's recent lowering of import barriers opens attractive market for U.S. petrochemicals. Their domestic demand is expected to increase tenfold by 1965, while production may only triple.

Chemicals price index dips to 1951 level

Rigorous measures to preserve profits called for by Dow's Gerstacker

"It seems almost fantastic but the index of chemical prices in the United States is right where it was in 1951." With this, Carl Gerstacker, vice-president, Dow Chemical, led into an analysis which calls for process innovation, continued cost cutting, and general belt tightening if hoped-for price increases cannot be realized.

Place: Mexico City, D.F. — scene of recent joint meeting of AIChE and Instituto Mexicano de Ingenieros Quimicos.

Describing life in the chemical industry today as "rugged," Gerstacker pointed out that other non-farm commodities have advanced 11 percent in price since 1951, but chemicals none.

Overcapacity, labor, transportation and taxes are among the troublesome factors. In the case of ammonia, as a result of the building wave of new plants a few years ago, "all fought for the same ton of business and prices fell to ridiculous levels. Demand has risen, to be sure, but capacity is still being expanded because new producers hope to take customers away from their present sources.

"We have seen a similar thing

happen in plastics. New producers have gone into manufacture of major plastics . . . often by merely purchasing processes. Result — plastics prices have declined as much as 25 to 50 percent. Old producers, with research costs to recover, have been able to hang on only by virtue of high volume and ability to improve processes."

Iodine, says Gerstacker, sells for about half of what it did a few years ago. But big tonnage items such as caustic soda and soda ash have not declined, nor have they gone up as have other commodities.

On the matter of costs, the chemical worker's pay for an hour's work has been rising at a compound rate of six to seven percent per year. This alone, says Gerstacker, amounts to a decrease in profits of more than 10 percent per year! (Based on assumption of wage and salary costs being 30 percent of sales. With a seven percent annual raise, 7 x 30 equals 2.1 percent of sales decline in profits — more than 10 percent of the pretax profit of most chemical companies.)

Cost of materials, transportation, taxes, product testing and

financing ("long-term interest rates have doubled in the U.S.") have all gone up, are still rising. Increasing customer services are getting to be another important cost factor.

Departing from his prepared paper, Gerstacker had this nine-point program to offer:

- 1 — We should stop building so far ahead of market's ability to absorb capacity
- 2 — Effort should be made to maintain adequate price levels (How? Gerstacker had no magic solution)
- 3 — Stop raising wages and salaries so far so fast
- 4 — Hope to reduce tax increases by demanding fewer government services
- 5 — Continue to press for more favorable depreciation rates from government
- 6 — Tariffs — explain to public that increased imports mean fewer American jobs
- 7 — Work harder and be smarter about reducing costs
- 8 — Create better processes
- 9 — Do without many things. We've gotten soft on overhead

Teachers get summer training in process dynamics

Specialized training in process dynamics, application of control engineering, and position occupied by computers in systems engineering has just been concluded by 30 professors of chemical engineering — one from far-away Spain.

Site of summer training was Washington University, St. Louis, Mo. Monsanto Chemical Co. donated use of its analog and digital computing laboratories and aid

of personnel where needed for instructional purposes. Financial underwriting of project was sponsored by the National Science Foundation.

Purpose of training is to equip teachers to incorporate systems engineering and process dynamics courses in chemical engineering curricula.

Courses presented to teachers included review of mathematics, process dynamics analysis, time

and frequency response methods, stability and nonlinear system analysis, optimization of system performance, and applications of computers.

Case Institute presented similar training in 1959, to 27 teachers. The project is sponsored by the Process Control Committee of AIChE (Dave Boyd, Universal Oil Products, chairman) and the Foundation for Instrumentation Education & Research.

Our Growing Industry

From page 8

Chemical Company—swap of common stock (265,000 for 640,000 shares) for assets of **Pittsburg & Midway Coal Mining Company**; **National Distillers and Chemical Corporation**—60% of common stock of **Mallory-Sharon Metals Corporation** which will be integrated with subsidiary **Johnston & Funk Metallurgical Corporation**; **American Metal Climax, Inc.**—cash purchase of **Pyron Corporation**; and **Allied Chemical Corporation**—toehold in West Coast resins and plasticizers market with purchase of **Specialty Resins Company**; and **Lestoil, Inc.** becomes **Lestoil Products, Inc.** subsidiary of **Adell Chemical Co.**

Multi-million dollar chemical center will be erected on 200-acre site near Peoria, Ill., by **Archer-Daniels-Midland Company**—start-up spring 1962. Center will produce nitrogen chemicals, plasticizers, esters and olefins.

Tidewater Oil Company and **Collier Carbon and Chemical Corporation** will build and operate 50 million lb/yr petroleum naphthalene plant at Wilmington, Del. Plant, to be completed late in 1961, will utilize **Union Oil Company of California** process.

Stauffer Chemical Company, **Shell Chemical Company** and **Western States Chemical Corporation** are forming a new company to build 50,000 ton/yr plant adjacent to Stauffer's Dominguez, Calif., plant. Facility will supply complex solid fertilizers to western market.

Operating initially at 20% of 175,000 ton/yr capacity is **Aluminum Company of America's** \$80 million ultra-modern Warrick, Ind., smelter. It is Alcoa's eighth facility in U.S. for producing basic aluminum. Alcoa recently acquired fourth major source of bauxite—30,000 acres in Jamaica. Production is expected to begin by June 1963.

Three construction projects are announced by **Hooker Chemical Corporation**—multi-million dollar synthetic phenol

These characteristics of **CAMBRIDGE METAL-MESH BELTS** give you fast, low-cost, uniform chemical processing

Whatever you process or package — slab, sheet, pelletized or powdered materials — Cambridge Metal-Mesh Belts combine movement with processing to give you greater production and consistently high quality without costly manual handling.

Open mesh construction allows heat, cold or liquids to flow through the belt and around the product for fast, thorough processing. Liquids drain off quickly, completely. Superior belt design and manufacturing techniques mean longer belt life, fewer repairs, lower operating costs. Smooth belt surface has no sharp edges; can be easily cleaned. Belts can be made heatproof, coldproof, acid proof — in any mesh, weave, metal or alloy — with any side or surface attachments.

Call your Cambridge Field Engineer now. He'll be glad to discuss any aspect of Cambridge Belts — from manufacture to installation and service. Look in the yellow pages under "Belting, Mechanical". Or, write for **FREE 130-PAGE REFERENCE MANUAL**.



**The Cambridge
Wire Cloth Co.**

Department F • Cambridge 8, Md.

Manufacturers of Wire Cloth,
Metal-Mesh Conveyor Belts, Wire Cloth Fabrications

Check 3643 opposite last page.

plant (using Hooker's new process) for Durez Plastics Division in northern Kentucky near Portsmouth, Ohio; \$1½ million semi-commercial process building at Niagara Falls, N.Y.; and sodium hexametaphosphate manufacturing facilities at Jeffersonville, Ind., Phosphorus Div. headquarters.

Monsanto Chemical Company also announces two new projects and start-up of another—a "major" West Coast production unit for phthalate esters at Long Beach, Calif., to be in operation by mid-1961; start-up of manufacturing unit at Nitro, W. Va., which doubles MCC Avadex and Vegadex capacity; and 50% expansion of its Anniston, Ala., facility for manufacturing parathion and methyl parathion.

Proceeds from sale of \$8 million Witco Chemical Company, Inc., debentures will be applied to \$10 million construction program, including \$5 million for phthalic anhydride plant (30 million lb/yr capacity) on East Coast; \$1.6 million synthetic detergents plant and prepolymer plant in Chicago; 50% share (\$1 million) of alkybenzene plant in California; and 50% (\$2 million) of synthetic latices plant in England.

Goodyear Tire & Rubber Company is expanding Niagara Falls, N.Y., vinyl resins plant, adding 20 million lb/yr to capacity at cost of \$1 million. Production set for fall.

Isocyanates production will be tripled as result of multi-million dollar expansion slated for Moundsville, W. Va., plant of Allied Chemical's National Aniline Division.

Two "space-age" contracts have been awarded by the Air Force—a \$12 million, three-year research and development contract on graphite for missile and space vehicle components to National Carbon Company, Union Carbide Corporation division; and \$20 million for liquid rocket fuel to Food Machinery and Chemical Corporation acting for a joint venture with National Distillers & Chemical Corp.

3 CENTRIFUGES for

PILOT PLANT OPERATIONS

SMALL PRODUCTION

PRODUCT DEVELOPMENT

1 - DEWATERING, CLARIFYING, CLASSIFYING

The Sharples P-600 Super-D-Canter continuously handles a wide range of particle sizes in slurries with solids concentration from ½% to 50%. The P-600 is the largest "small" centrifuge of its type available to industry, and has high capacity, both liquid and solids. Write for Bulletin 1287.

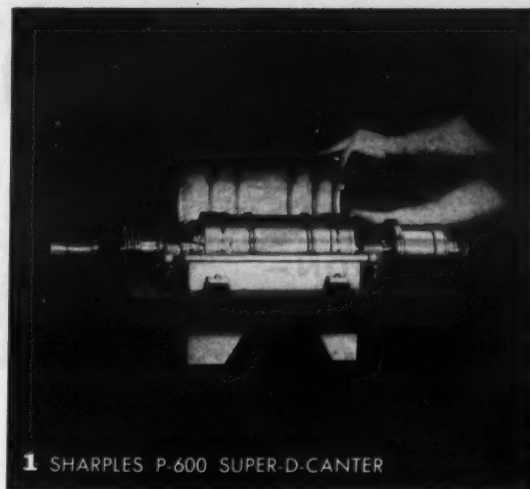
2 - EXTRACTING, SEPARATING, CLARIFYING

The rugged Fletcher Pilot Plant Basket centrifuges routinely handle loads up to 80-100 lbs./cu. ft. densities, with variable speed drive from 800 to 3250 RPM. Perforate and solids baskets are quickly interchangeable. Full range of "big machine" vents, feed pipes, skimming nozzles, etc. Write for Bulletin 103.

3 - SEPARATING FORCE OF 62,000 x G.

The Sharples Laboratory Super Centrifuge is standard equipment for many process operations involving the recovery of small amounts of solids from liquids, clarification of liquids, and separation of two immiscible liquids. Continuous or batch types available, motor or turbine driven, with built-in cooling or heating coils if desired, and open or Presurtite models. Write for Bulletin 1269.

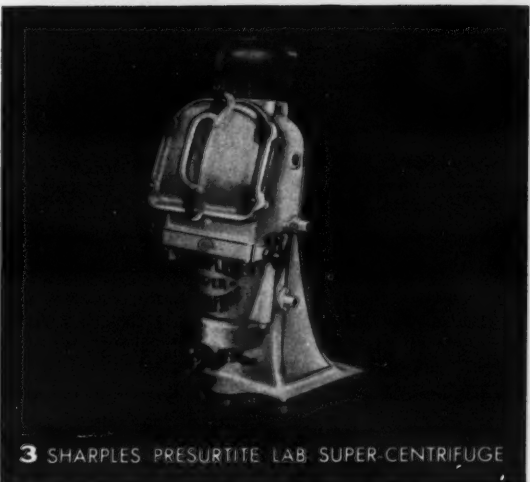
All three of these Centrifuges may be scaled up directly to the performance of their larger Sharples and Fletcher counterparts.



1 SHARPLES P-600 SUPER-D-CANTER



2 FLETCHER "PILOT PLANT" CENTRIFUGE

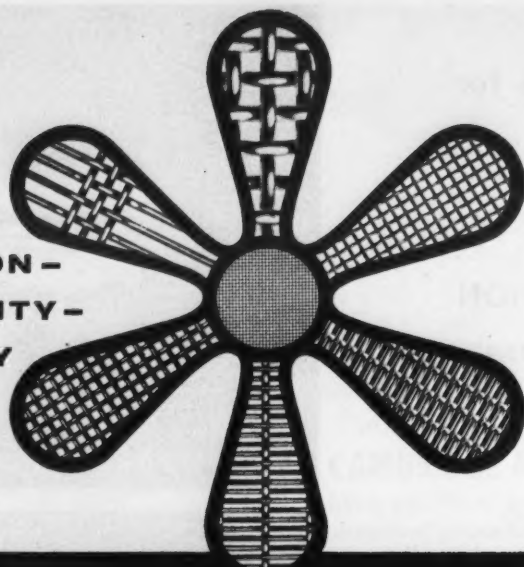


3 SHARPLES PRESURTITE LAB SUPER-CENTRIFUGE

THE SHARPLES CORPORATION
Centrifugal and Process Engineers
2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • HOUSTON • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA
Associated Companies and Representatives throughout the World

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**PRECISION -
DURABILITY -
ECONOMY**



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and **STAR**

WIRE CLOTH AND SCREEN



IF your Filtering, Screening or Straining operations are costing you more than they should—
IF the results you want aren't up to expectations—you need Ludlow-Saylor or Star wire cloth or screen.

Whether your operation involves problems of corrosion, pressure, vibration, heat or abrasion . . . more than a century of experience in precision weaving of the best quality wire available promises the exact screen or cloth to produce a product that meets the toughest specifications.

If one of the hundreds of weaves, meshes and metals in-stock doesn't meet your requirements, we can promptly weave precisely what you need. The industry's finest facilities and know-how are at your service. Write for NEW Catalog 105, just off the press.

L-S and Star Cloth and Screens are woven from stainless steel, Monel, bronze, copper, brass, high carbon and oil-tempered steel, and virtually any metal that can be drawn into wire.

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Houston 5630 Harvey Wilson Dr. • Pittsburgh Union Trust Bldg.

STAR WIRE SCREEN AND IRON WORKS, INC.

(L-S Subsidiary) Los Angeles, 2515 San Fernando Rd.

Check 3645 opposite last page.



**Watching
Washington**

**Conservationists/Pest Control Feud
to Receive Federal Airing**

The relationship between chemical control of agricultural pests and conservation of America's wildlife will be studied by a new committee of the National Academy of Sciences-National Research Council. This is the latest step taken by the Academy during the past few years "in response to concern" over use of Chemicals to control agricultural pests.

In announcing the committee, the Academy noted "a grievous lack of objective data." Some persons responsible for pest-control programs, the announcement continued, tended to minimize the injurious effects of the chemicals they use, while some conservationists tended to maximize such damage.

Committee Functions

Functions of the committee:

- 1) Provide technical advice and guidance to bring about maximum control of crop pests with minimum damage to wildlife.
- 2) Provide critical evaluation of both the direct and indirect effects of various pest-control operations on plants and animals.
- 3) Stimulate new research where gaps exist and encourage investigations in progress to obtain factual information as a basis for sound guiding principles and policy determinations.
- 4) Foster cooperation among various agencies, organizations, industries and individuals interested in pest control. Those concerned with pest-control effects on fish and wildlife would also be included here.

planned procurement of liquid-oxygen (LOX) generators for use in the U.S.

The private LOX industry has ample facilities to meet the Air Force's requirements, and the national security would be best served by reliance upon the numerous dispersed commercial producers of this essential product, the Committee concluded.

The committee recommended that the Air Force consult representatives of private industry in reviewing this problem. Their report stated, "The review should take cognizance of the impact upon private industry . . . Government agencies should not operate any commercial or industrial facilities unless commercial sources are clearly unable to meet their needs."

**Fat market for nitrogen
in meat industry**

Chemical processors in the nitrogen-gas business have a new outlet for their product in the meat industry. The Department of Agriculture has approved nitrogen gas for applying or injecting enzyme solutions to beef cuts.

The treatment must not result in a gain of more than (3%) above the weight of the untreated product. Enzyme solutions consist of water, salt, monosodium glutamate and papain.

**Private LOX producers
boosted by Senate**

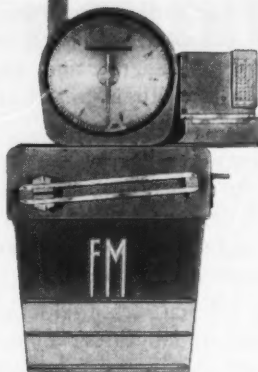
The Senate Small Business Committee has charged the U.S. Air Force with "unwarranted competition" with private business in the

NOW... an accurate printed record of everything you weigh *Automatically!*

- Time, date and other identifying symbols may also be recorded simultaneously with weight.

- Weights are printed in digits 5/32" high.

- Also available: consecutive numbering devices, repeaters, coin operating mechanism, balance detector, roll tape and ticket printing, open throat design printer that permits weight tickets to be inserted from either front or side.



**Yours at the touch of a button
with the Fairbanks-Morse
PRINTOMATIC WEIGHER**

THE VERSATILE ATTACHMENT that fits any F-M Floaxial Dial Scale to provide you with accurate permanent printed records. Completely eliminates the possibility of human errors in weighing operations; does away with costly disputes between buyer and seller, weighman and trucker. Instead, you get *truly automatic weighing* . . . the Floaxial Dial Scale plus Printomatic accurately record correct weights on tickets, roll tape or both!

WAREHOUSES find *Printomatic* valuable in effective cost control. *Printomatic* furnishes a printed, permanent record of every shipment entering the warehouse—an effective check on the cost of raw materials.

INDUSTRIAL OPERATIONS often include *Printomatic* directly on the assembly line to accurately weigh and tag products and product parts.

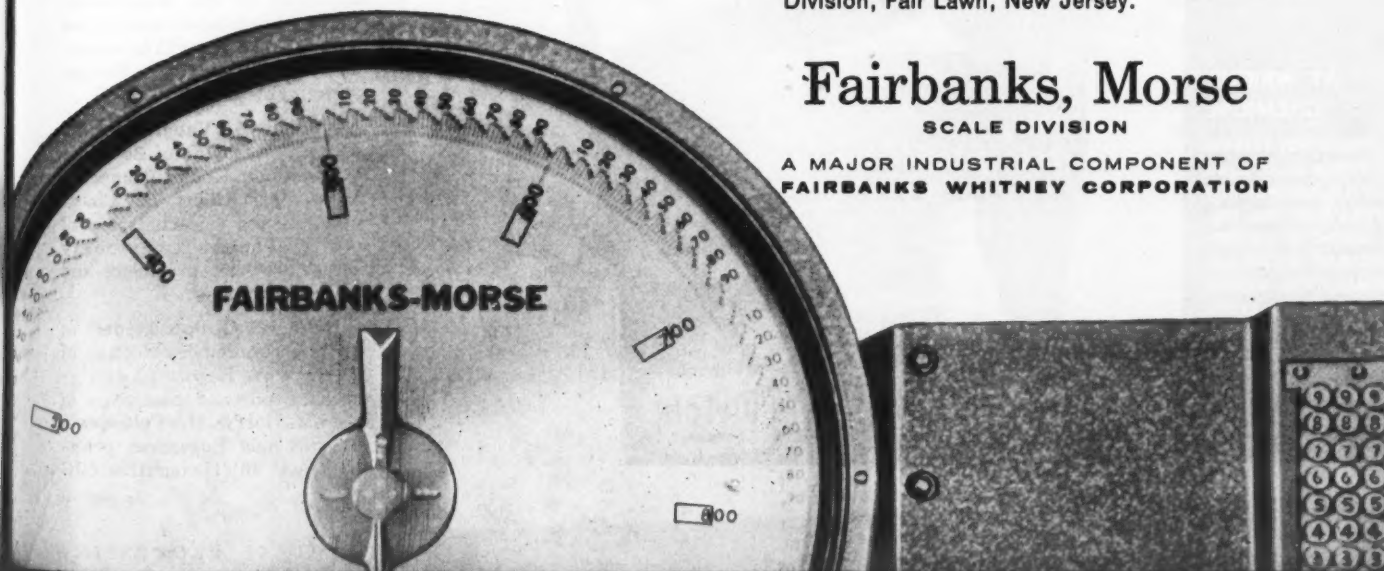
F-M *Printomatic* Weigher makes the printing of weight figures a simple matter—no matter what the application! Check these dependable Fairbanks-Morse *Printomatic* features.

Learn how truly automatic weighing, the Fairbanks-Morse *Printomatic* way, can make your operations more efficient, more profitable. Write to Fairbanks, Morse & Co., Scale Division, Fair Lawn, New Jersey.

Fairbanks, Morse

SCALE DIVISION

A MAJOR INDUSTRIAL COMPONENT OF
FAIRBANKS WHITNEY CORPORATION



Unequalled in speed, in compact size, in extra-thorough mixing



Spotlight On People

NEW president of AviSun Corporation, jointly-owned affiliate of American Viscose Corporation and Sun Oil Company is **Dr. Herschel H. Cudd**, vice president in charge of research and development at American Viscose.

He succeeds **Chalmer G. Kirkbride**, recently promoted to vice-president in charge of research and engineering for Sun Oil. AviSun was formed in February 1959 to manufacture and market polypropylene resin, film and fiber.

Dr. Ralph T. K. Cornwell, for 14 years director of research for the film division, has been named technical assistant to Gerald S. Tompkins, American Viscose president.

Dr. Carl F. Prutton, Food Machinery and Chemical Corporation executive vice president in charge of the chemical divisions since 1956, has resigned due to ill health. He will continue to serve as director, a post held since 1955, and consultant. **William N. Williams**, FMC vice-president is new manager of the chemical divisions.

E. I. du Pont de Nemours and Company, Inc., is reorganizing the research and development division of the Polychemicals Department to further emphasize future new products. As director of pioneering research, a new organization, **Dr. William E. Grigsby** will consolidate and extend long-range research activities of the department. Research related to established plastics business will be supervised by **William A. Franta**, director of plastics R & D.

William S. Vaughn is the seventh president of 80-year-old Eastman Kodak Company, succeeding **Albert K. Chapman**, elected vice-chairman of board. Vaughn previously served as vice-president and general manager.

Lithium Corporation of America announces election of **Herbert W. Rogers** to newly-created post of chairman of board. **Harry D. Feltenstein Jr.** succeeds Rogers as president and chief executive officer.

To page 16

new concept for mixing chemicals **THE SMITH TURBINE MIXER**

The new Smith Turbine mixer utilizes an entirely new idea in mixing chemicals. Centrally mounted paddles — set at precise angles — revolve inside a stationary, doughnut-shaped tank. As these paddles move through the mix at high speed — up to 600 fpm — they produce a unique braiding and folding action.

This mixing action not only is remarkably fast, but it also gives theoretical dispersion of particle size and ingredient to a wide range of dissimilar and disproportionate materials. Blending is fast and complete, with no particle breakdown due to crushing. Segregation and throw-out are eliminated because centrifugal forces are continually interrupted by paddle action.

The Smith Turbine's compact size and vibration-free operation enable you to install it in existing mixing areas with little or no alterations. Or it can be installed in new areas or new buildings without any special consideration for supporting structures or headroom allowances.

Turbine capacities range from 100 cu. ft. production models to a ½ cu. ft. pilot-plant or laboratory model. However, capacity alone is a poor guide to performance, since the Turbine turns out batches so much faster than any other type mixer.

Every one of the Smith Turbine's advantages can improve your plant mixing operations. Our engineers will be glad to prove this by running production tests using your materials, or they will arrange for a test right in your own plant. Interested? Write or call us today for more complete information.

T. L. Smith Company, Milwaukee, Wis.



AT WRIGHT CHEMICAL

The Smith Turbine quickly batches drum-sized loads. Unit is conveniently charged from the top, easily sealed to contain fumes and dust, discharges directly into waiting shipping drum.



Check 3647 opposite last page.

THAT'S
INTERESTING

Gas geared for climate

Although it may come out of a pump bearing the same brand name, the gasoline which goes into your tank varies depending on where you live and what time of year it is.

Volatility of gasoline, an automobile's octane needs, its tendency to knock, are all affected by weather and geographic conditions, so refiners have divided the U.S. into

four geographic sections and the gasoline used in those sections is determined on a basis of anticipated weather conditions.

Gasoline is refined in three types: winter type, spring-fall, and summer.

For more information on product at right, specify 3648 see information request blank opposite last page.



CARBORUNDUM'S TECHNICAL INFORMATION ON ELECTRIC HEATING

Data sheet

HEATING WITH SILICON CARBIDE ELEMENTS

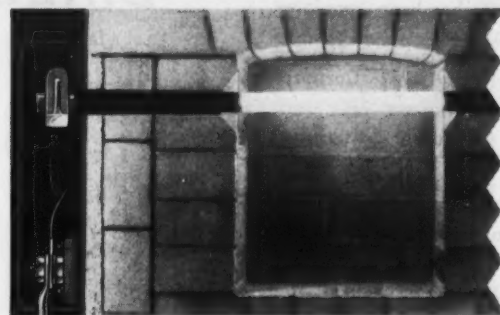
With electric heat, temperatures can be precisely maintained, cycles can be exactly duplicated, and furnace temperature can be accurately controlled. Product quality is improved, rejects sharply reduced. Electric furnaces and kilns are compact, clean, quiet and thoroughly dependable. There's also no fire or explosion hazard.

For these reasons, investigation of an electric heating application should include more than a comparison of Btu or electricity costs. The advantages and savings of electric heat frequently more than offset fuel cost differential. And this is particularly true in the case of furnaces heated with SiC elements.

Heating with GLOBAR® silicon carbide elements offers designers, builders, and operators of process equipment distinct advantages:

- Rod type elements simplify furnace design and construction.
- Long and trouble-free service. Maintenance is reduced and servicing simplified.
- Exceptionally high efficiency, low heat loss, clean radiant heat. No exhaust gases or combustion fumes. Cooler and safer working conditions.
- Elements easily and quickly installed from outside the furnace, there's no need to cool or unload the chamber. Production and operating losses are minimized.
- Temperatures up to 2800° F. Accurate heating independent of atmosphere.
- Elements can be operated continuously or intermittently in oxidizing or protective atmospheres within certain limitations.
- Transformers unnecessary for some applications. With these "on-the-line" installations, even lower initial cost.
- Elements available from stock or within 2 weeks if manufacture is necessary. Sizes range from 1/4"-2 1/8" in diameter, and from 4"-105" in length. Resistance tolerance only ±10%. Elements matched to meet your requirements.

Carborundum's accumulated experience and data may help solve your process heating problems. We invite your inquiries or contact electric furnace builders.



An element is a round rod with a heating section and a low resistance terminal at each end. The heating section is silicon carbide recrystallized for strength and rigidity at high temperatures, and contains no bonding material. The extremities of the terminals are metallized with aluminum to provide low resistance contact with the flexible straps. Elements can be mounted horizontally or vertically.



Ease of replacement is important feature of GLOBAR® elements. Operators simply shove in new ones without cooling down the kiln or furnace.

Typical applications of GLOBAR® silicon carbide heating elements

- Annealing, sintering, brazing and heat treating of metals
- Firing ceramics
- Calcining powders and magnetic materials
- Silver soldering and the firing of silver on ceramic parts
- Roasting fluorescent oxides
- Forging high strength, precision pieces
- Firing of porcelain enamel
- Reduction of oxides
- Sublimating molybdc oxide
- Production of Magnesium
- Melting and annealing glass

Write today for your free copy of our technical Bulletin H describing physical and electrical characteristics of GLOBAR elements. The address: Dept. CP-80, GLOBAR Plant, Refractories Division, Niagara Falls, New York.



For latest advances in silicon carbide heating elements . . . count on **CARBORUNDUM®**

PEOPLE

From page 14

Robert M. Aude, vice-president and general manager since 1958, has been appointed president of the Heyden Chemical Division of Heyden Newport Chemical Corporation.

Sun Chemical Corporation with an eye to expanding research and diversification has named **Samuel B. McFarlane Jr.** to new post of vice-president-research.

Harold A. Swanson has been named vice-president in charge of Technical Products Division of E. F. Drew & Company, Inc.

General managers of five divisions of the Dewey and Almy Chemical Division, W. R. Grace & Co., have been appointed vice presidents, President George W. Blackwood announces. They are: **Thomas G. Gibian**, Organic Chemicals Division; **Russell L. Haden Jr.**, Polyfibron Division; **Dr. Jacob G. Mark**, R & D Division; **Edward L. Mears**, Container and Chemical Specialties Division; and **J. Wade Miller**, Central Services Division.

Joseph W. Selden has been elected divisional vice president for Chemical Division of Minnesota Mining and Manufacturing Co.

Antone Vittone Jr. has been moved up from plant manager of B.F. Goodrich Chemical Company's Avon Lake development center to general manager of plants. **Dr. R. J. Wolf** succeeds him as director of development. In another executive change, **Dr. Benjamin M. G. Zwicker** becomes BFG-CC director of planning.

Dr. James W. Evans, vice-president-research of American Maize-Products Company, has been elected director.

Election of **Dr. Guy T. McBride Jr.** as vice president of Texas Gulf Sulfur Company is announced by **Claude O. Stephens**, president.

Three new divisional vice-presidents have been named by Olin Mathieson Chemical Corporation. They are: **Dr. Herman A. Bruson**, vice-pres-

Reporting more news from ...

CRANE DIRECTION '70



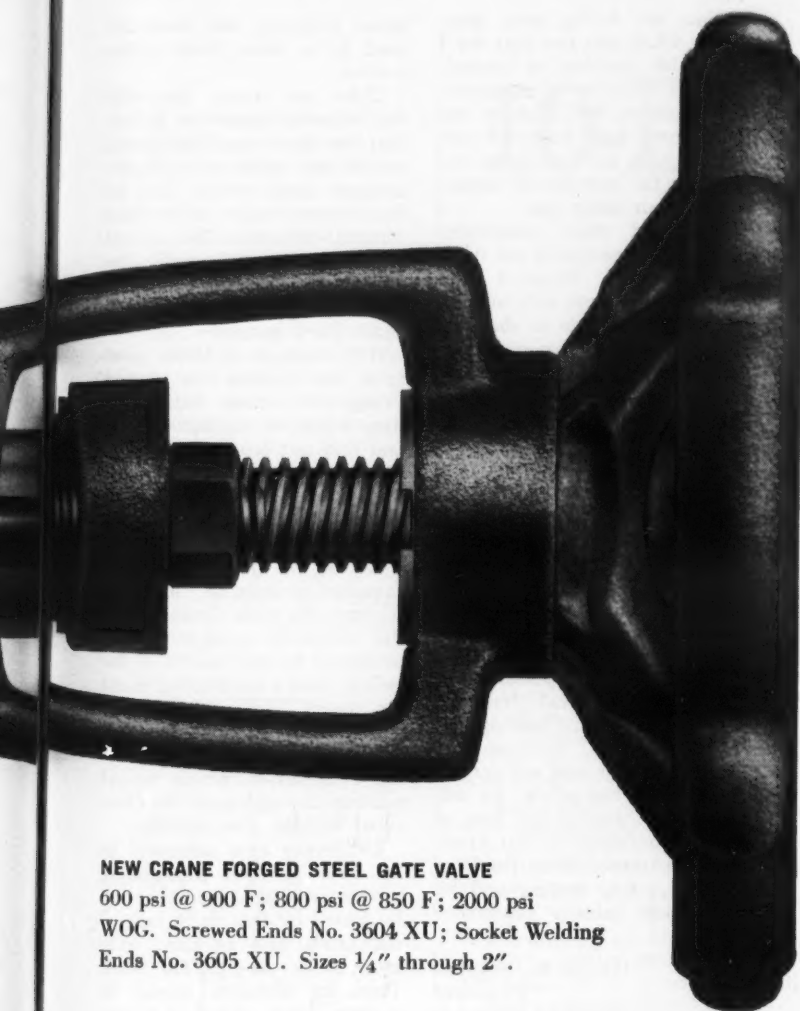
... a fast-moving program of planned expansion, product development, and streamlined distribution to help our customers meet the competitive challenges of the Sixties.

COMPLETELY



REDESIGNED!

THE NEW SMALL FORGED STEEL GATE VALVE



NEW CRANE FORGED STEEL GATE VALVE

600 psi @ 900 F; 800 psi @ 850 F; 2000 psi WOG. Screwed Ends No. 3604 XU; Socket Welding Ends No. 3605 XU. Sizes 1/4" through 2".

This is a whole new valve, not just one with a new feature added. This redesign incorporates all the features you told us you wanted plus a few others we know will make this valve a better buy in terms of longer service life, less maintenance, easier and faster servicing.

Like the new "bow-leg" yoke, which for the first time gives you plenty of hand room for easy stuffing box maintenance. And like the long-life braided asbestos packing, with Inconel wire insert. The "universal" trim that can be used for either oil or steam, eliminating many of your stocking problems. The spiral wound stainless steel bonnet gasket with asbestos filler, made blowout-proof with a male-female joint.

But what we really want you to remember, more than any single feature, is that this Crane valve is the newest—all new—valve on the market... well worth considering when you need small, high-pressure steel gate valves. We'd like you to compare this new valve with any other comparable valve feature for feature.

Your local Crane distributor has technical literature and a complete selection of these valves right in stock. Call him on small steel gates. In fact, he's your best bet to call no matter what valve you want because he carries the broadest line of quality valves in the world.



CRANE CO., INDUSTRIAL PRODUCTS GROUP
4100 S. KEDZIE AVE. • CHICAGO 32, ILL.
VALVES • ELECTRONIC CONTROLS • PIPING
PLUMBING • HEATING • AIR CONDITIONING

ident-research, Chemicals Division; **Milton O. Schur**, vice-president-research, Packaging Division; and **Donald W. Champlin**, vice-president for engineering and planning, Winchester-Western Division. Two corporate level changes were also announced. **Arthur T. Safford** has been named director of marketing, a newly-created position; and **Ian D. Ritson**, director of construction, also a new post.

George dePasquale has been named vice-president in charge of marketing for Baird Chemical Industries, Inc.

Dr. Charles D. Harrington has been advanced from manager of Mallinckrodt Uranium Division to vice-president of Mallinckrodt Nuclear Corporation, wholly-owned subsidiary of Mallinckrodt Chemical Works. **Frank Zeitlin** becomes general manager of MNC while **Stanley H. Anonsen** succeeds Dr. Harrington as manager of uranium division.

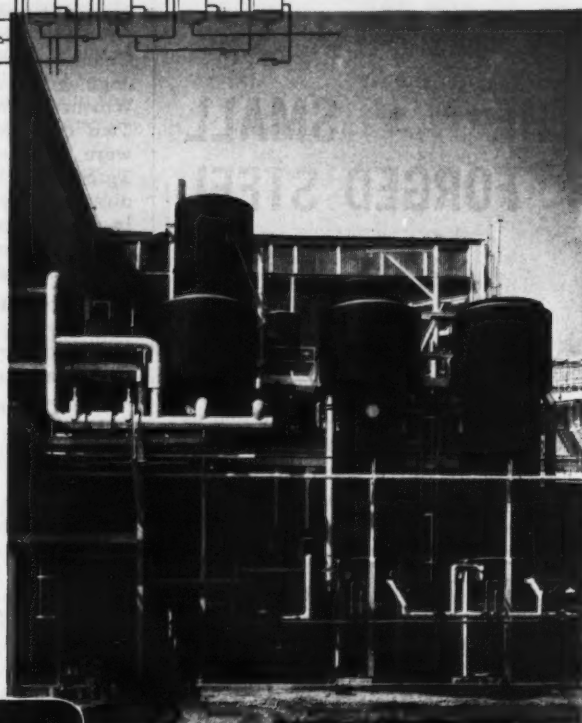
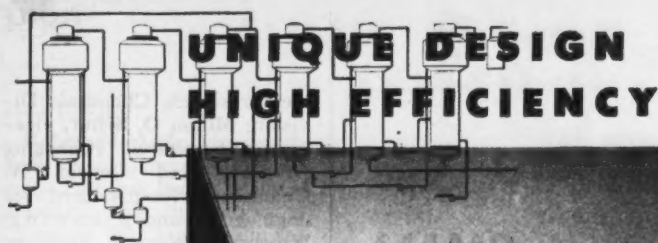
John L. Ellis has been named vice-president of Chromalloy Corporation and general manager of its Sintercast Division.

William J. Ashe has moved up from controller and assistant secretary to administrative and financial vice-president of Witco Chemical Company, Inc.

Newly promoted to supervisor-market research of the Dyestuff and Chemical Division of General Aniline & Film Corporation is **Dr. Richard Berger**.

Dewey Mark has been appointed manager of petrochemical sales for Tennessee Oil Refining Company, division of Tennessee Gas Transmission Company.

Three executive changes have been announced by American Cyanamid Company. **Dr. Nolan B. Sommer** becomes assistant general manager of the Commercial Development Division; **T. Dean Smith**, manager of the Petrochemicals Department and **B. B. Putnam**, manager of the Explosives and Mining Chemicals Department.



BLACK LIQUOR EVAPORATOR at NEW SOUTHERN PAPER MILL

This six body, sextuple effect evaporator system was installed in a U-shaped arrangement and was designed to concentrate 428,000 lbs. of black liquor from 14 per cent to 50 per cent solids content, when supplied with 56,000 lbs. per hour of 45 psi steam. The high efficiency of this system (5.52 lbs. of water per pound of steam) was made possible through a new and novel feed arrangement into the evaporators. The first effect evaporator is equipped with 2 inch diameter stainless steel tubes while the other five have welded seam carbon steel tubes.

For more detailed information
write for bulletin #PI 509-1



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FILTERS / EVAPORATORS / PROCESS EQUIPMENT
CONTRACT MANUFACTURING
Including HEAVY CASTINGS

Check 3650 opposite last page.



letters from readers

CP Food Additives Stand Is Scored and Praised

The four letters below are in reference to Gordon Weyermuller's article, "Anti-Chemicals Cannons Keep Roaring . . . CPI Must 'Break Silence,'" which began on p. 20 of our May issue.

Sirs:

You are being very generous when you say you don't blame Mr. Mabley for his lack of understanding of this complex subject. Mr. Mabley has been very well informed and armed with the true facts, regarding the safe use of chemicals in our daily use.

We, and other companies and many readers of his daily column have supplied him with enough facts, but, in spite of this he persists in shouting the beliefs of the organic farmers and of Dr. W. Coda Martin.

You are right. We do need more vigilance and expressions from our industry to the general public to combat the harm that is being caused by writers such as Mabley.

If the editors of newspapers will not give our industry the space to tell our story to counter the effects of scare columnists, then we should buy the space and still get the true facts to the public.

If the Chemical Industry insists on . . . just talking this problem over between its members only, and not getting the facts to the public, we will pay very dearly by loss of public confidence of our products, by unnecessary duplication of safety testing and by increased liability insurance rates.

GEORGE R. CHAMLIN
President
Continental Chemists
Corporation
Chicago 12, Ill.

Sirs:

Certainly no one can deny the things you chose to mention, but not a controversial item was mentioned. Certainly some drugs can kill if not

taken properly, but most are used for a short time under control.

There are many chemicals the industry wants us to use that we know nothing about, concerning cumulative effects, because these effects can be determined only after long constant exposure. We do not know whether 9.25 mg per day will be detrimental to health in five years or not until five years have passed!

But, because it looks good in a few months (or should I say still seems harmless), they want to market it now and find out later. This is the type of thing we who back Rep. James Delaney are concerned about, and many of us are scientific people also.

It may be all right for the chemical-processing industry to beat its own drum about the wonderful products it has produced for the benefit of the public (and a substantial profit for itself). But perhaps they should also establish or promote a Certified Clinical Testing Association which would achieve the status of the Certified Public Accountants.

Let every new chemical to be used in food production, processing and preservation be tested by this truly impartial group and be used only after it has the CCTA label. Then the industry would be putting deeds ahead of ballyhoo and would really have something to talk about.

And they would then also regain the confidence of those of us who are in the industry, and know how the profit motive can push products that should not be used without adequate testing.

MARTIN K. WEBER
Berkeley, Calif.

Sirs:

I agree that this group of hypochondriacs have gone to an extreme, but then it is very hard to disprove their claims. However, there is a need to inject a note of sanity into the controversy.

JAMES WATSON
EMERYVILLE, CALIF.

Sirs:

I find that you, too are guilty of a considerable amount of pussy-footing. Why not blame Mr. Mabley for lack of understanding of the subject of his article? And why not blame the editor of the paper that publishes such nonsense and loaded garbage?

I doubt very much that the public should be exposed to such uninformed drivel, and we should make it crystal clear that this is journalism at its worst.

Put the blame where it belongs. Writing without knowledge is irresponsible and must be kept out of widely read publications.

OTTO C. ELMER
Akron, Ohio



"Here's an order from Nairobi for 300 native war shields."

4 Tear Here for Filing

FLUIDICS* AT WORK

10-DAY DELIVERY

on a full line of Pfaudler
Glasteel reactors



"Off-the-shelf delivery" is our term for these completely assembled lab, pilot plant and production-size Pfaudler® Glasteel reactors. All are prestocked for a quick, ten-day delivery after receipt of your order.

Check your requirements against these specifications:

Pfaudler "P" Series Reactors

30-gallon (30 p.s.i. internal); 1½ h.p. motor, agitator speed 50-300 RPM
50-gallon (25 p.s.i. internal); 1½ h.p. motor, agitator speed 50-300 RPM
100-gallon (25 p.s.i. internal); 2 h.p. motor, agitator 50-180 RPM

All are clamped-top type, jacketed, and have the following: standard legs, Teflon-enveloped gaskets, 3-blade agitator, non-metallic seal, 2.5TW variable speed drive. Complete specifications in Bulletin 927.

Pfaudler "E" Series Reactors

200-gallon, 3TW variable speed drive, 5 h.p. motor, agitator speed 50-165 RPM

300-gallon 4TW variable speed drive, 7½ h.p. motor, agitator speed 32-150 RPM

500-gallon, 4TW variable speed drive, 7½ h.p. motor, agitator speed 32-150 RPM

All are clamped-top type, jacketed, and have maximum internal pressure of 25 p.s.i., code approved for 90 p.s.i. jacket, 3" flanged outlet, standard legs, Teflon-enveloped gaskets, 3-blade impeller, rotary seal, upward deflecting baffles set low, jacket safety valve. Complete specifications in Bulletin 971.

Pfaudler "RA" Series Reactors

500-gallon, 4TW drive, 3" rotary seal, 5 h.p. motor, 117 RPM

750-gallon, 5TW drive, 3½" rotary

seal, 7½ h.p. motor, 90 RPM
1000-gallon, 5TW drive, 10 h.p. motor, 97 RPM

2000-gallon, BH-30 drive, 15 h.p. motor, 120 RPM

All are one-piece, jacketed and have maximum internal pressure of 100 p.s.i., Teflon-enveloped gaskets, 3-blade impeller, upward deflecting baffle set low. Complete specifications in Bulletin 988.

Other standard reactors

The standard line of Glasteel reactors ranges from 1 to 4000 gallons with a choice of 29 different models. Normal delivery quoted, except as outlined above.

Write now for the individual bulletins listed and/or for a summary "spec" and price sheet. Address inquiries to our Pfaudler Division, Dept. CP-80, Rochester 3, N.Y.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.



PFAUDLER PERMUTIT INC.

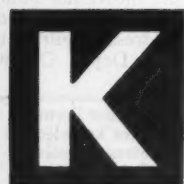
Specialists in FLUIDICS ... the science of fluid processes

Check 3651 opposite last page.



That's right, mister! One of the simplest, most economical ways to cut downtime and maintenance is to use Kuhns Ductile Iron Pipe Fittings.

They have the strength and shock resistance of carbon cast steel, the resistance to rusting and corrosion of alloyed cast iron. Vibration and thermal shock are worries of the past when you put in "K" ductile iron fittings which have been pressure rated by Underwriters' Laboratories, Inc. The advantages of increased safety, lower operating costs and lower maintenance add up to more profits for you. No wonder the swing is toward "K" ductile iron fittings (unlined or lined) and components. Kuhns also supplies a complete line of cast and malleable iron fittings. Ask for complete details.



THE KUHN'S BROTHERS CO.
1800 McCall Street • DAYTON, OHIO
Cast, ductile and malleable iron fittings

Check 3652 opposite last page.

LETTERS

G. & J. Weir slighted

Sirs:

Our attention has been drawn to an article which appeared on page 190 of your April issue, referring to the issue of a postage stamp by the Aruban Government to mark the opening of the sea-water distillation plant on that island.

In it you state that the plant was "designed and built by Singmaster & Breyer Inc." We wish to point out that the 2,240,000 gpd sea-water-distillation plant depicted on the stamp was entirely of this Company's design and manufacture, as are the similar smaller plants on the neighbouring island of Curacao.

In the case of Aruba, Singmaster & Breyer were brought in by the Government to let the various parts of the contract, which included steam-raising plant, etc., not of our manufacture.

H. G. C. SMART, MIAMA
Publicity Manager
G. & J. Weir Ltd.
Glasgow, Scotland

While line of cast-iron evaporators depicted on stamp were designed and built by Singmaster & Breyer, Inc., plant of which they are a part was work of G & J Weir, Ltd.

ARE YOU A CARTOONIST?

CHEMICAL PROCESSING will pay:

\$10 for black ink cartoons
(with gag lines) on 8 1/2" x 11" sheets — ready to reproduce — payable on acceptance.

\$5 for cartoon ideas — written descriptions or rough sketches of scenes — and captions.

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Don't forget to include your name, address, and company affiliation.

Highly Intimate Blends in 1 to 2 Minutes

Blends while discharging; No segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials — within 3 to 5 minutes of start of charging.

Six complete blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat — is highly effective yet gentle and safe even with explosives.



Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way right from start of charging.



Discharging

Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.

Self-cleaning, dust-sealed drum; one-man accessibility

Operation of Sturtevant Blenders is self-cleaning — drum interiors are completely dust-sealed. For inspection of all models, one man simply loosens a few lugs to remove manhole cover — quickly and easily.

Nine standard models with capacities to 900 cu. ft.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N. C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

Fully or semi-automatic, or manually controlled operation

Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs — can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (Bulletins also available on Mixers, Air Separators, Micronizers, Crushers and Grinders.) Write today. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 3653 opposite last page.

CHEMICAL PROCESSING

THAT'S
INTERESTING

Fluid glass

Series of inorganic glass compositions, some of which are liquid at room temp, are being studied by Bell Telephone Laboratories scientists.

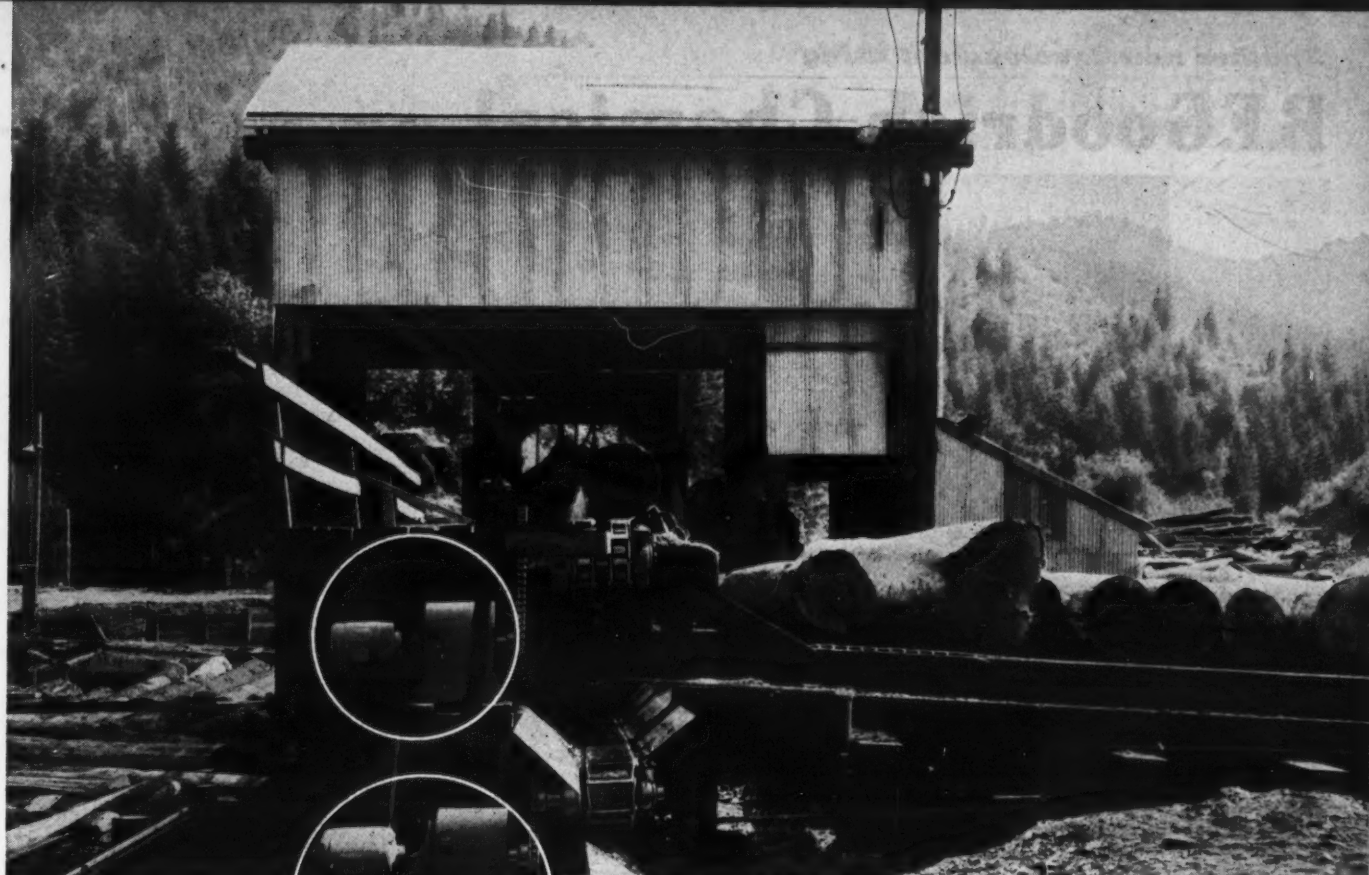
Glasses are composed of varying proportions of elements arsenic, sulfur and bromine.

Rings as dosimeters

Gold wedding bands have acquired new value in the eyes of scientists who are searching for something that people normally have with them which would provide an index of radiation exposure in case of war or accident.

Gold bombarded with thermal neutrons, gives single gamma ray activity with half life of 2.69 days which can be counted with any kind of counter. Doses as low as 25 to 50 rads can be measured.

For more information on product at right, specify 3654 see information request blank opposite last page.



FALK Motoreducers driving log conveyor and refuse conveyor at the modern mill of The Bohemia Lumber Company, Culp Creek, Oregon.

FALK all-steel Motoreducers give you longer service life

Whether your load conditions are normal or heavy, the extra rigidity of all-steel construction (more than twice that of cast iron) maintains better alignment of revolving elements under load...a vital factor in prolonging the service life of gears and bearings.

And if your installations are subject to shock loads, or accidental external impacts, you're way ahead when you install Falk All-Steel Motoreducers. These rugged units do not destroy themselves by tearing off their feet under jamming overloads, nor are their housings subject to cracks which both dissipate the vital lubricant supply and allow revolving elements to get out of alignment.

All-steel construction is one of the built-in extras that you get in Falk Motoreducers. Others include: (1) inherently stronger gear teeth (by AGMA standards), thanks to exclusive Falk extra-depth, high pressure angle helical gears; (2) maximum mechanical efficiency (98½% per gear mesh, under full load); (3) your choice of standard units (horizontal, vertical or right angle) to fit your precise requirements.

HORSEPOWER RANGE: to 75 hp ... **STANDARD OUTPUT SPEEDS:** 780 rpm (high) to 1.2 rpm (low).

Prompt delivery from distributor stocks, or from warehouse or factory. Ask your Falk Representative or Authorized Falk Distributor for **Bulletin 3100**.

THE FALK CORPORATION, MILWAUKEE 1, WIS.

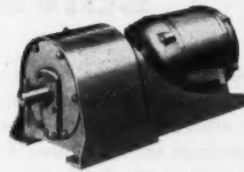
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

FALK

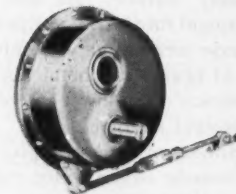
... a good name
in industry

Take your choice of all-steel drives when you specify Falk



THE FALK ALL-MOTOR
MOTOREDUCER

... the original All-Motor unit



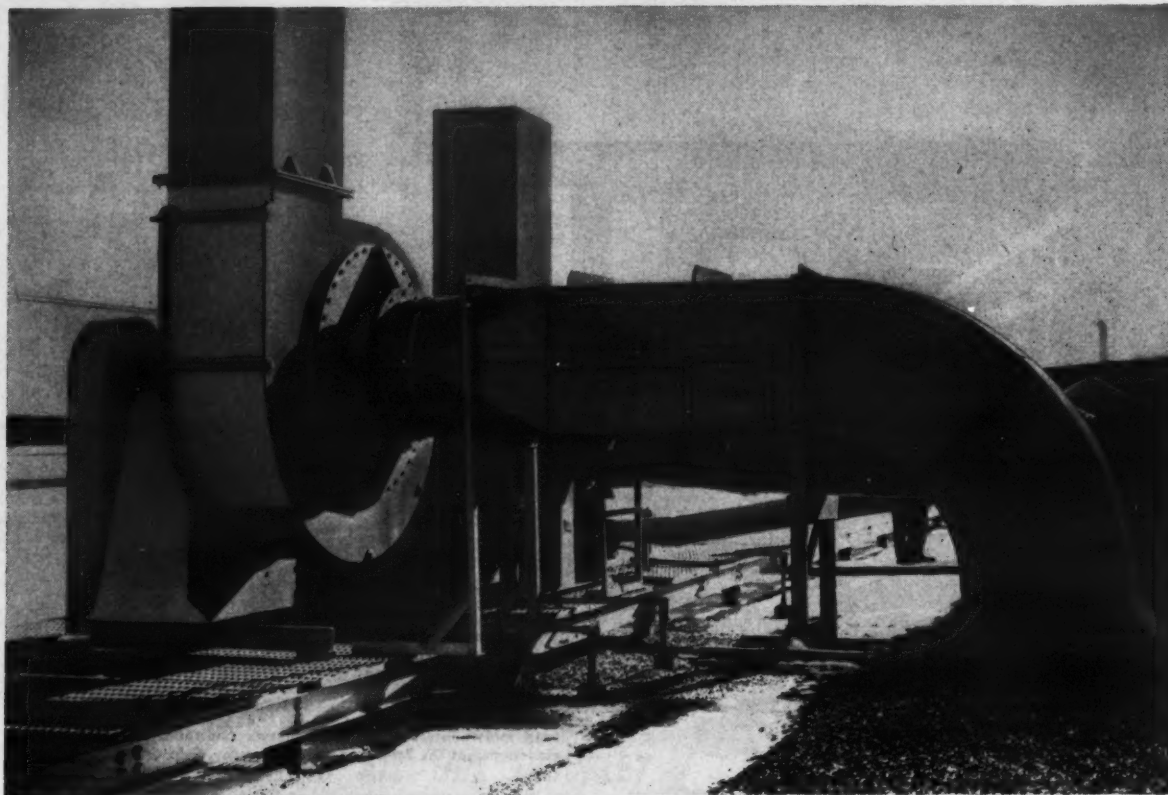
THE ALL-STEEL FALK
SHAFT MOUNTED DRIVE

Torque ratings to 44,000 lb-in at low speed shaft. Also available in flange-mount design.

FALK and All-MOTOR are
Registered Trademarks.

Another new development using

B.F. Goodrich Chemical *raw materials*



Blowers and fans, ductwork and fittings and bolts, nuts and washers are all manufactured of Geon by Industrial Plastic Fabricators, Inc., Norwood, Mass. B. F. Goodrich Chemical Company supplies the Geon polyvinyl material.

Blower and ductwork of Geon solve corrosive fume problems

The manufacturer of this air handling equipment can promise buyers efficiency as high after years of operation as right now. The equipment is made from sheet made of Geon rigid vinyl. Unlike conventional coated blowers and fans which usually handle just one type of chemical fume, this equipment withstands corrosion and residual build-up of nearly all chemicals. Installations are often lower in cost because of weight savings.

Sheet of Geon rigid vinyl is extremely versatile for fabrications

like this—it can be heat-formed to a variety of shapes, precision welded, machined and finished to close tolerance. The flexibility made possible with Geon makes possible new design features impractical with other materials because of prohibitive costs.

Geon rigid vinyl materials are providing new applications and new markets for a broad variety of manufacturing companies. For information about the many forms in which Geon can be obtained, write Dept. GO-7, B.F. Goodrich Chemical

Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company



GEON polyvinyl materials • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

Check 3655 opposite last page.

LETTERS

The Antidumping Act

Sirs:

This is in reference to the article by me on The Antidumping Act, 19 U.S. Code 160 (April CP, p. 26). Since that time there has been a development which makes the article out of date in one respect.

In dealing with the evaluation of circumstances of sale, I made reference to a provision contained in then proposed regulations to the effect that such circumstances would generally be allowed or disallowed by the Treasury depending upon whether or not they involved a benefit or detriment to the purchaser.

Public comment solicited with reference to the proposed regulations has in the meantime been examined and found to be almost universally unfavorable to this provision. The provision has accordingly been deleted from the more recently published definitive regulations, which became effective July 5, 1960 (Treasury Decision 55118).

Instead, provision is simply made that allowances for differences in circumstances of sale will be limited, in general, to those which bear a reasonably direct relationship to the sales which are under consideration.

JAMES POMEROY HENDRICK
Assistant of the Secretary
of the Treasury
Washington, D. C.

NEXT MONTH

Three articles on the new Air Reduction Chemical plants at Calvert City, Ky. are planned for September. One of these will tell why the company chose Japanese processes for making polyvinyl alcohol and PVC plasticizer. C. J. McFarlin, president of Air Reduction Chemical, is preparing this article.

The second article will cover the plant beautification program and present pro and con arguments on this subject. Third article will describe the PVC process being used at the plant.

Easy credit techniques; dumping; subsidized competition; declining demand for U.S. capital; resurgent industrial might, rebuilt with U.S. aid, all add up to grim picture for CPI ventures abroad

Rising world competition threatens U.S. chemical leadership

JOHN MELLECKER, Editor
Industry Planning and Research

THE American chemical industry is facing a tough fight abroad with ultimate repercussions at home, from rising foreign competition in chemicals.

Likewise, the American engineering-construction industry that builds chemical plants and petroleum refineries around the world, is meeting changing demands for its services that presage serious revisions in its manner of overseas operation.

Europe, in the throes of uniting into a common-market ultimately comprising 250 million people, offers tantalizing possibilities for products of our chemical industry's plants here and abroad. But the common market will also unite European chemical manufacturers and engineers-constructors into formidably large competitors. These people, traditionally driven to finding their income in overseas trade, are topnotch business contenders as small com-

panies. Combined into giants, they will be better equipped, thus harder for our firms to cope with unless we adopt tough new techniques of our own, and considerably more support is given our industry by the government.

This is the substance of what many chemical industry leaders are thinking and worrying about today.

Clearly, a revolution is taking place in world chemical manufacture and trade. Only through understanding what is happening and what can and should be done can we be prepared for the future.

Our Aid Rebuilt Competition

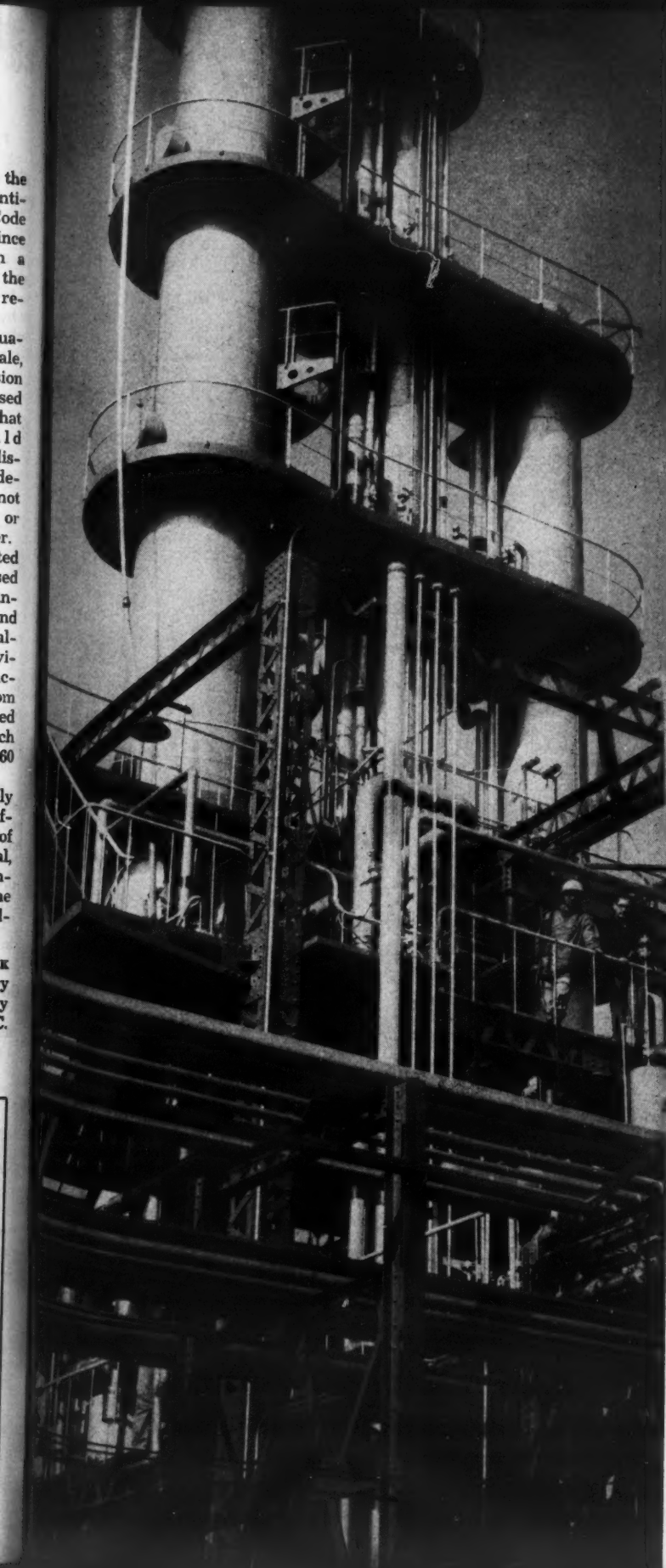
Our overseas chemical destiny really got underway when World War II destroyed much of the manufacturing industry of Europe and Japan. It is not necessary to cite how much our Marshall Plan and Point IV aid contributed to the rebuilding of both areas.

It was only natural that our then highly-g geared chemical industry began supplying the needs of so many countries.

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Japanese ammonia plant, owned by Asahi Chemical, has capacity of 100 tons/day—Chemico photo

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Rising world competition threatens U.S. chemical leadership *From page 23*

In effect, we temporarily inherited the export chemical business of the world, being the only nation capable of supplying such demand.

Ultimately the British, Germans, French and others who had been major factors in pre-war exporting, resumed international trade. Once back on their feet, they began aggressively soliciting needed business, offering as one of their inducements, repayment credit. We had managed our post-war boom on essentially a cash-on-the-barrelhead basis, and were slow in following suit with comparable credit.

Part of our reluctance stemmed from complacency over having sold primarily surplus chemical materials, both prior to and after the war. Post-war, we supplied hungry markets fed capital by aid plans. In short, we were not selling abroad because of necessity, as had our temporarily indisposed competitors.

Now in market after market, whether in developed areas such as Europe, or the less-developed areas such as Latin America, the Europeans and Japanese are again proving to be eminently successful exporters of chemical materials. Backed by long experience, easy credit terms, low prices, government subsidies and credit guarantees, they make formidable opponents to our dividend-earning unsubsidized firms.

In such an environment our companies are comparatively understaffed, have relied too much on agents, and tend to be slow in meeting credit competition. Our government would seem to take the view that our private companies engaged in overseas operations must be regulated so that what they are doing will not be harmful to others, or too beneficial to themselves as large corporations.

Lure There, Pressure Here

Fortunately, there is a growing aggressiveness in our chemical industry, a realization that if fight we must, we will fight.

Behind this is the lure of the vast markets that are already awakening in Europe, Japan, Australia, India and some countries of Latin America. And so, some of our chemical companies are aggressively establishing strong footholds while still possible, figuring that as time goes on, getting needed equity will be more difficult, as is already the case in some countries of Europe, Latin America, and Japan.

While some home markets have been reaching saturation many companies have turned their creative energies abroad, organizing international divisions, establishing joint relationships with local firms in foreign lands, and building plants abroad.

Some stockholder groups have supported these activities; others have been prompt to quiz managements not showing indications of overseas interest. Getting into the overseas chemical field is the "right" thing for management to be doing, according to many. "It may be 'right' from the standpoint of increased dividends for the stockholders of the next decade," comments one financially-oriented head of an internationally-functioning company, "but no one should expect quick returns from our overseas manufacturing operations. There's too much that should prudently be plowed back before trying to realize ultimate profits."

Generally speaking, it is not the investment of American private capital that is wanted by most underdeveloped countries. Some countries, hungry for capital, politically fear financing that could symbolize colonialism.

What is wanted, everywhere, is special know-how, service, talent, or devices that will make important contribu-

tions to the country's economy.

Union Carbide is doing this with its successful polyethylene process in Italy, Australia and Japan. Du Pont has done the same with Orlon and Neoprene. Stauffer's know-how in agricultural chemicals, Hercules in papermakers' chemicals, Atlas' in specialties, each represents some area of contribution . . . to cite a few examples.

U.S. Leadership Receding

Perhaps, most enigmatic of all is the increasing difficulty for us to export our previously admired and much sought-after technical know-how, managerial talents, and marketing techniques. Enough of the outside world has improved its own capacity to render such services, that our leadership is receding.

I asked several executives where they think we really are ahead today, technically. Process-wise, they mentioned partial oxidation of hydrocarbons and isoprene production and polymerization. Undoubtedly, there are many more than the two processes mentioned.

In pharmaceuticals there is no doubt that we lead the world.

A few think our chemical engineering is subject to much emulation, but others commented that this may be the case with smaller foreign companies, but no longer so with the larger European and Japanese firms who have been catching up fast.

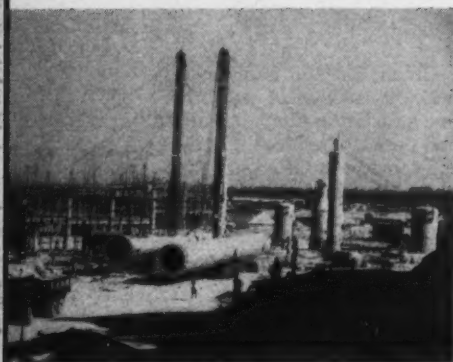
Our engineer-constructor services as provided by large, totally integrated organizations are "undergoing considerable change in concept as overseas customers are looking for more specialized services which fit with growing competence of local contractors," reports M. W. Kellogg's long-time Director of Construction Joe Smith. "Sometimes our firms are asked to serve as advisors to the degree required by the individual

To next page

◀ Pastoral view of South American scene with refinery pressurized storage vessels

Rising world competition threatens U.S. chemical leadership

From preceding page



Construction is underway on 200 ton/day ammonia plant at Fenchugang, East Pakistan, owned by Pakistan Industrial Development Corp. Note almost complete absence of heavy equipment, wooden scaffolding—photo courtesy of Chemico



Same Pakistan plant showing construction workers. Note women and the baskets used for transporting excavation dirt, etc.—photo courtesy of Chemico



Plant workers in South America—photo courtesy of Stauffer

client as regards construction and start-up."

Now, if the American general contractor wants welders not available locally, he more often than not trains local people who never before in their lives might have known that welding existed. "The surprising thing about this," reports Smith, "is that such people soon do really fine work."

Doing It The Hard Way

Throughout the world, there is rapidly fulminating pride of accomplishment and ability on the part of local technologists. Unfortunately, this is sometimes translated into intense, restricting nationalism by the politicians.

How to assure ourselves of effective control of our manufacturing operations abroad under such circumstances is getting to be a first-class problem. Germany, Italy, Japan, for example, have formal restrictions on equity in plants by foreign corporations. Japan now limits equity to 8%. West Germany had a limit of 8%, but recently upped this to 16%. In Latin America, although the situation may be more flexible, the pressures are reported high for local control. "Everyone in these countries keeps arguing the advantages of having local people who know local conditions running the manufacturing facility," reports a veteran overseas executive. "For the more complex processes, this may be an entirely unsafe assumption, which unless opposed may lead to jeopardy of the plant being subject to decisions by inexperienced or politically-oriented personnel."

Obtaining a management contract is regarded by many as a satisfactory compromise — giving American technical experts effective control over the way the facility is operated. Another device is a holding company owned by public subscription or public funds, and which has no management prerogative as long as operations are normally

conducted by the American firm who brings the technical skill to the project.

Equipment Enigma

In the field of new plant construction, many may be surprised to learn that in Europe and Latin America, U.S.-made equipment is up against stiffest competition from European manufacturers. In addition to prices from 10 to 25% lower than those quoted from the U.S., long credit terms are often offered.

For example, in its latest prospectus describing intended petrochemical expansions, Pemex, the Mexican government petroleum authority, reveals it expects to obtain engineering of its plants from U.S. engineer-constructors, but equipment from Europe. There it is obtaining terms allowing repayment over a period of seven years — presumably out of income from operation.

One engineer-constructor told me that in ammonia plants built overseas with U.S. equipment, 10 to 12% might be added to the cost of the plant, as compared to the same plant with European equipment. On the other hand, the plant with U.S. equipment can sometimes be erected in one year, whereas with European equipment, two years are likely to be required. Loss of 12-months production would seem to offset a good deal of added equipment cost.

Easy Terms

Another comment was that, "in Latin America price really doesn't count as heavily as does credit." If correct, this simply means U.S. equipment manufacturers in going after this market need not lower prices, just find some way to grant longer credit terms than anyone else.

Battle lines over credit are actually drawn most sharply around chemical materials. Latin America has recently adopted a device which requires the importer to deposit in advance of delivery of goods

being imported an amount of currency equal to the value of the goods coming into the country. Soon the more aggressive exporters began putting up this money for the importers. Today it is common practice for U.S. firms to have on deposit in these countries sums equal to the average amount of business they are doing. "This," comments one exporter, "is a neat little device by which these countries have raised working capital."

Only three or four years ago, the Germans are said to have begun offering long-term credits for materials sold in Latin America. What this amounted to was putting materials into a customer's warehouse and allowing him to pay as he used them. The latest extension of such credit practices resulted when a German firm granted 365 days credit on such materials. We are said to be operating on a two- or three-month basis.

'Dumping' Is Problem

Perhaps the most disturbing factor about the export market is that some European and Japanese manufacturers are actually "dumping" in the Latin American as well as certain other markets, delivering goods to these areas at substantially less than their normal manufacturing and shipping costs. One executive commented, "it seems to be a matter of selling at direct operating and shipping cost, less the subsidy granted by their governments. My guess is that in Germany, plants based on coal-tar raw materials may be kept running for political reasons — to avoid precipitating cutbacks in coal mining. . ."

Does such "dumping" work out to the advantage of the underdeveloped country needing the chemical materials. Apparently, much of the time countries really needing these materials have a shortage of currency with which to buy at even the cut prices. Too, many of these countries know from bitter experience when the commodity gets in-

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Chemical Producers Temper Views On Protective Tariffs

**Direct requests for lower foreign duties open door
to reciprocal reduction of U. S. tariffs**

*Despite the concern about foreign competition,
the international business of chemical
companies is getting better every year.
With increased export sales and the formation
of international divisions, pressure for removing
trade restrictions both here and abroad
is building up.*

When Douglas Campbell, secretary-treasurer of the Pulp Chemicals Association, went to Washington recently to seek reductions in foreign duties for the 18 chemical producers his organization represents*, he met with a surprising fact that signifies a changed attitude on chemical tariffs by many chemical producers.

Lowell B. Kilgore, Director, Chemical and Rubber Division, Business and Defense Service Administration, U.S.



Douglas Campbell, secretary-treasurer, Pulp Chemicals Association, was instrumental in obtaining the agreement of the 18 firms represented by the organization to press for lower foreign duties on tall oil and turpentine products

Dept. of Commerce — the Government official who handles chemical tariffs and who will attend the GATT parleys in Switzerland this year — said that this was the first time he knew of that any representative of the chemical industry had come to his office with a request for lower foreign duties.

There's little doubt that requests for lower duties in foreign countries on U.S. chemicals shipped overseas mean that equivalent concessions must be made on chemical imports into the U.S. Hence, the overall effect of this reciprocity will be a reduction in tariff barriers both here and abroad.

Mr. Campbell asked for reduced foreign tariffs on tall oil fatty acids, refined and

distilled tall oil, sulfate turpentine, rosin and terpenes. One interesting development was that some chemical company representatives remained behind to request lower foreign duties on other products not covered by the Pulp Chemicals Association.

Of the 18 companies represented by the Pulp Chemicals Association, 10 are paper companies. Paper companies generally are also seeking reductions on exports of pulp and paper to Europe and Japan.

In addition to these paper companies and their associates, the international petroleum companies strong in petrochemicals — such as Gulf Oil Corporation and Standard Oil of California with its Oronite subsidiary — have long favored liberal trade policies. Oronite's export sales are running more than 20%.

Eastman Chemical Products also has asked for decreased duties on plastics shipments to Europe. Representatives of such companies as General Mills and Cabot Carbon Company have spoken out for lower tariffs in the past. All

in all, there's quite a segment of the CPI that favors more liberal trade policies.

Some Feel They Must Fight Tariff Reductions

Of course, many chemical companies still feel that proposed reductions on U.S. chemical tariffs pose a serious threat and they intend to resist reductions on many different products. Representatives of such companies as Dow Chemical and Wyandotte Chemicals have spoken out for protective tariffs in the past.

The Synthetic Organic Chemical Manufacturers Association has put its members on the alert. SOCMA, along with MCA, was instrumental in convincing the Tariff Commission that basket clause concessions should not be made but each individual item considered by itself. The MCA has formed an International Operations Committee to assist members with any problems concerning foreign trade.

Due to the many conflicting interests among chemical companies, many chemical trade associations have been forced to take a more or less neutral stand on tariffs and not say too much about them.

Of course, it isn't just foreign duties, but such things as quota restrictions and currency problems that must be overcome to increase exports.

One reason that many chemical companies are taking a second look at the tariff picture is the steadily increasing

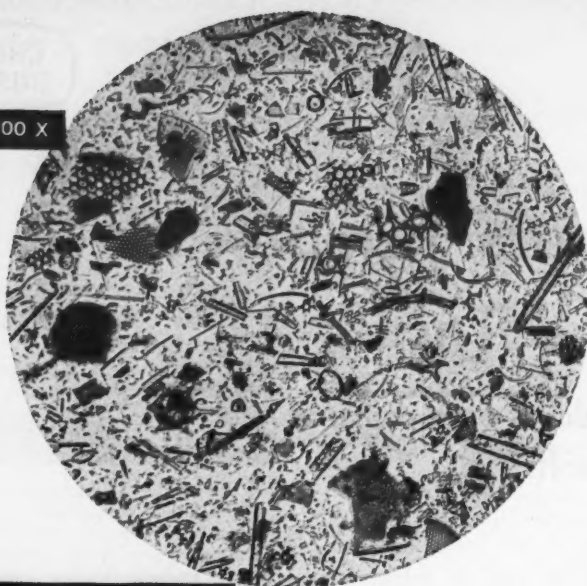
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***Pulp Chemicals Association Represents These Firms:**

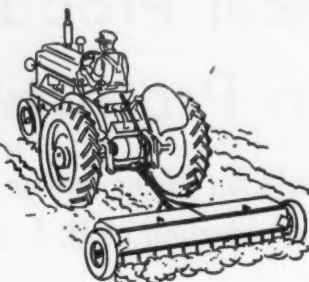
Arizona Chemical Company
Bowaters Southern Paper Corp.
Brunswick Pulp and Paper Company
The Champion Paper and Fibre Co.
Continental Can Company, Inc.
Crossett Chemical Company
Crown Zellerbach Corporation
East Texas Pulp and Paper Corp.
Georgia Kraft Company

The Glidden Company
Hercules Powder Company, Inc.
Monsanto-Emery
Newport Industries Company
Owens-Illinois Glass Company
St. Joseph Paper Company
St. Regis Paper Company
Union-Bag Camp Paper Corporation
West Virginia Pulp and Paper Co.

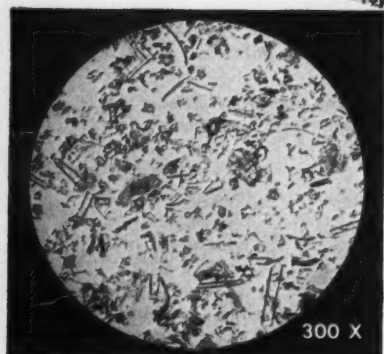
300 X



For fertilizer coating—Celite 379, a natural milled diatomite, provides the uniform conditioning needed to prevent caking of granular, mixed or prilled fertilizers—maintains good free-flow characteristics even after prolonged storage.



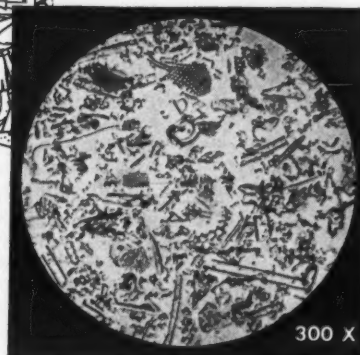
For catalyst carriers—Super Flow, finest particle size flux-calcined Celite grade, is used where a non-reactive porous silica support is needed. (Also available: special Celite supports in many preformed shapes for strength, high temperature stability, resistance to abrasion and attrition.)



300 X



As a point-flating agent—Celite 281, air-floated fines of flux-calcined diatomite, provides uniform and efficient flatting at low cost. Contributes to control of low angular sheen, durability, and faster drying.



300 X



In diatomites, Johns-Manville precision processing works for you

Celite diatomite absorbs its own weight of liquid... yet stays 'dry'

No matter which of the many available grades you choose, you can depend on a given volume of inert Celite* to retain its typical dry-powder characteristics even after absorbing its own weight of liquid.

Actually, Celite can absorb a total of more than twice its own weight. That's because a mass of the fine skeletal particles is approximately

93% air space or voids. Yet, in spite of this very high porosity, Celite is essentially non-hygroscopic.

Other unique properties—extremely high bulk, irregular particle shape and large available surface area—ideally suit Celite to hundreds of mineral filler applications. It is produced with precision from the world's purest commercially available dia-

tomite deposit. It offers a wide choice of grades, each carefully controlled for complete uniformity.

For technical data on specific mineral filler or filtration problems, talk to your nearby Celite engineer. Or write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

JOHNS-MANVILLE



Check 3656 opposite last page.

Commenting On Secretary FLEMMING'S Reference to 'Statements in the Trade Press' . . .

Howard P. Milleville, Editor of FOOD PROCESSING says:

In his answer to the second question on the opposite page, Mr. Flemming objects to statements in the trade press "... alleging that the Food Additives Amendment will in effect wreck the food industry..." I don't know of any such statements.

Presumably he may be referring to my statements in the April issue of FOOD PROCESSING which present the legal and scientific basis for accusing him of irresponsible administration. Or he may be referring to criticisms of Mr. Flemming's administration appearing in FOOD PROCESSING and other business publications which point out that one of the two objectives of the food additives law is:

"To advance food technology by permitting the use of food additives at safe levels."

Mr. Flemming makes the interesting observation that consumers who become aware of these statements in the trade press tend to be convinced that industry would wreck the public health.

Unfortunately this observation appears to be true, but only because untimely and ill-considered warnings by Mr. Flemming have undermined public confidence in what is actually the world's safest food supply. (cf FOOD PROCESSING, February 1960).

Mr. Flemming thinks that industry "... could do more to demonstrate to consumers that it supports the principles of the Food Additives Amendment, and that consumer safety is at all costs the over-riding consideration." He should add

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*House Report No. 2284, 85th Congress, 2nd Session, July 28, 1958. The other objective is: "To protect the health of consumers by requiring manufacturers of food additives and food processors to pretest any potentially unsafe substances which are to be added to food."

The Deafening Silence

In presenting Secretary Flemming's exclusive answers to these 10 questions herewith, CHEMICAL PROCESSING points up the challenge the CPI must meet.

The chemical industry has been, and is, facing its "moment of truth" before the onslaughts of its critics in the increasing crescendo of the additives crisis. To date, this seems to be "the battle that never was." The field has thus far been left to the likes of William Longgood (author of *The Poisons In Your Food*) and Rep. James Delaney (originator of the no-tolerance-

limit Delaney Clause dealing with carcinogens).

CHEMICAL PROCESSING has raised its editorial voice in protest against the morass of half-truths and misinformation poured out daily in great volume by a motley array of food faddists and political opportunists. The ar-

ticle, "Anti-Chemicals Cannons Keep Roaring . . . CPI Must 'Break Silence'," (May CP, p. 22) was our attempt to outline the chemical industry's obligation to speak out strongly on its own behalf in this matter.

An "above-it-all" attitude is the quickest road to disas-

ter for the industry. As the drug manufacturers are finding out, there are many enemies of business who will use any means at their disposal to cut the hamstrings of free enterprise. Their greatest ally is ignorance; platitudes are not enough to halt them.

In answering CP, Mr. Flemming stated "Industry has not yet told its story in a straightforward, dignified way." We could not agree more with him on this point. CHEMICAL PROCESSING and the public are listening for the strong voice of the CPI to break the "deafening silence."

"There is a good story to be told about the usefulness of food additives, along with the story about how the new Law is designed to insure their safety. Industry has not yet told its own story in a straightforward, dignified way."

A CP Staff Report

Flemming Challenges CPI To Tell Its Additives Story

... stands firm on Delaney Clause



Secretary Flemming

Ten key questions on the controversial Food Additives Amendment were posed by CHEMICAL PROCESSING to Secretary of Health, Education & Welfare Arthur Flemming. Here are his answers exclusively for CP's readers:

Q. Mr. Flemming, what is being done to tie together in some usable form all the information on additives and uses? (similar to the U. S. Pharmacopoeia)

A. There is no such project in the Government to the best of my knowledge, and I do not

know what is being done or may be contemplated by industry. Perhaps we should consider such a project, but it has not yet been discussed with me.

Q. If you agree that more information should be provided to the consumer about food additives, can you suggest what industry might do in this regard?

A. I think industry could do more to demonstrate to consumers that it supports the principles of the Food Additives Amendment, and that consumer safety is at all costs the overriding consideration.

I think that some of the statements in the trade press, alleging that the Food Additives Amendment will in effect wreck the food industry, tend to convince consumers who

become aware of these statements that industry would rather wreck the public health instead.

There is a good story to be told about the usefulness of food additives, along with the story about how the new Law is designed to insure their safety. Industry has not yet told its own story in a straightforward, dignified way.

Rebuttal

Our associate publication, FOOD PROCESSING, has published many articles concerning the impact on the food industry of the Food Additives Amendment. On the opposite page Howard P. Milleville, Editor of FOOD PROCESSING, comments on Mr. Flemming's answer to the above question.

Q. Do you have any suggestions on how the chemical in-

dustry can better cooperate in achieving the goal of the new Law?

A. The immediate need is to take positive steps to deal with the several hundred chemicals not now regarded as generally recognized as safe, but for which an extension of the effective date of the Amendment has been granted to March 6, 1961.

In many cases, this will call for cooperation between manufacturers and users to list all that is known about the toxicity of the items, how they are used and what they are used for in our food supply. This, of course, applies to both direct and indirect additives.

In many cases, a search of the scientific literature will produce very helpful infor-

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FOOD PROCESSING's Editor, Howard P. Milleville gives his views.

Enjay Girds for Stronger Push Into Plastics, Petrochemicals

- ▶ POLYPROPYLENE now under intensive market development
- ▶ CUSTOM-TAILORED POLYMERS for special needs are ahead

By JOHN MELLECKER, Editor
Industry Planning & Research

When the world's largest oil company moves into plastics, one can expect a well-gearred production-marketing-product setup in the offing.

Jersey Standard's culmination of a three-year building-up project shows the following results so far:

▶ New plastic Escon polypropylene, in currently U.S. largest capacity — 40 million lb annually available from plant at Humble's Baytown refinery.

▶ Extra 60 million lb annual production unallocated capacity in same polyolefins plant, which uses Zeigler low-pressure olefins polymerization process.

▶ Process which embodies continuous operation and new improved catalyst (titanium alkyl) having 10-fold increase in activity.

▶ Four-year contract with the polyethylene-experienced Spencer Chemical to take up to one-half the polypropylene output of plant; other polyolefins are included in contract. Purpose of contract is obviously to enable Humble to keep production high.

▶ Enjay field and supportive marketing staff designed to push broad spectrum of polyolefins with emphasis on let's-try-it-out-on-your-product customer service.

▶ Three technical labs heavily equipped with extrusion, injection molding, and testing equipment. Located at Linden, N.J., Baton Rouge, La., and Baytown, Texas, these combine customer and plant technical service. More than 40 physical tests are required on each new homopolymer.

Just to assure that Jersey Standard is by no means a beginner in the petrochemicals field, it can now be pointed out that Enjay, domestic marketing affiliate, is already seventh largest chemical company in U.S., and fourth largest supplier of petrochemical raw materials to one of the very largest chemical manufacturers.

Enjay's kick-off into plas-

tics with polypropylene signals an important new trend for the petroleum giant — the processing of petrochemical raw materials into products closer to the consumer market.

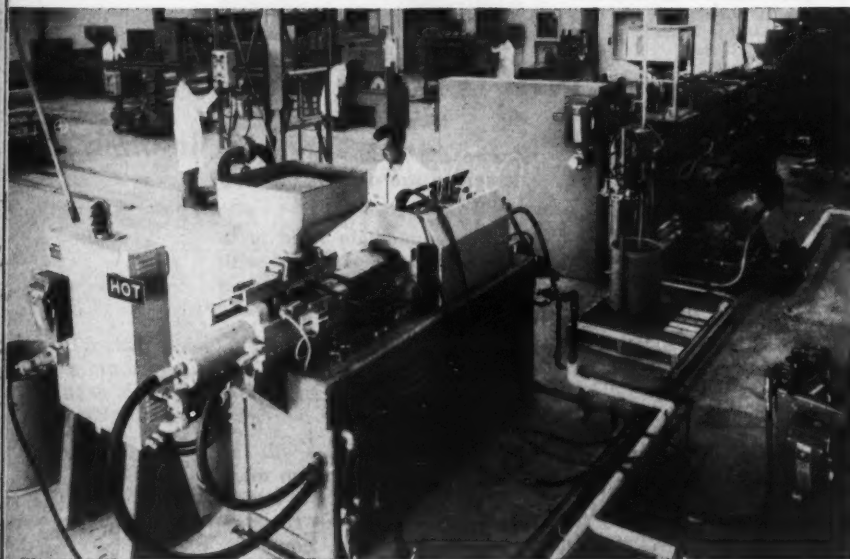
Polypropylene could hardly have been surpassed as a choice item for entry into the field. A favored contender for part of the billion-plus-lb (and still growing) polyethylene market, it also promises to grab off new growth areas from old standby cellophane.

Better resistance to high temperatures (steam-sterilized at 250°F), lighter weight, and excellent "snap back" properties make extruded and injection-molded polypropylene an excellent growth prospect at its present 42¢/lb price for molding compound.

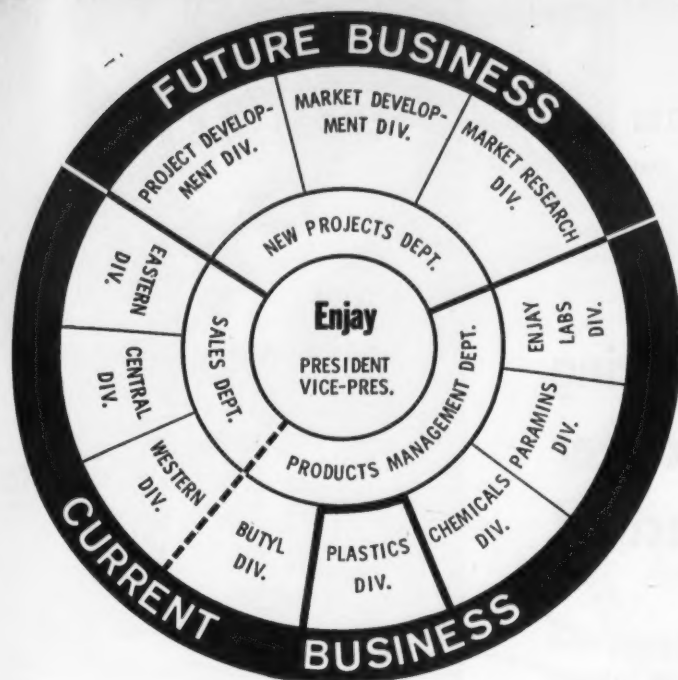
2½ lb of Polypropylene in 1961 Automobile

Currently, the automotive market is a best bet. Enjay has a special task force probing automotive engineers in Detroit. Three-quarters lb polypropylene is going into each (average) 1960 model car. Actual tooling will call for 2½ lb in each 1961 model. Thus, in a single year, polypropylene's acceptance goes to about \$15 million. Enjay's fieldsters are after a piece of this business.

Favored automobile uses: For steering wheels its high strength and "snap back" qualities are appreciated by designers. But it is polypropylene's freedom from ab-



Part of Enjay's polyolefins technical service lab at Linden, N.J.—one of three. Others at Baytown and Baton Rouge



This organization will take the world's largest oil company into a future of petrochemical variety

sorbing perspiration odor from the hands during cool weather, creating an odor in hot weather, that has won its acceptance. Seat covers woven of polypropylene monofilament have advantage over vinyl in that no plasticizer is present to volatilize when hot and condense on the inner surfaces of glass to form greasy film.

Under intensive displacement attack are die-cast parts. Enjay believes its Escon will perform as well or better than metal now in several places in a car. Further, in production runs of 1/2 million or more identical pieces, studies show lower mold costs with injection rather than die-cast molding.

Packaging Film, Other Uses Are Shaping Up

Another big potential is **overwrap packaging film**. Here surface gloss equal to cellophane, and barrier quality better than polyethylene or cellophane, offer attractive advantages.

Bread is currently the largest overwrap market potential. Here advantage over polyethylene is that polypropylene doesn't stretch when housewife "feels" loaf to test

freshness, leaving the loaf looking as if it's missing a slice.

Polypropylene can be put through polyolefin film wrapping machines as fast as cellophane through cellophane machines. But because stiff cellophane machines are designed to "push" the film through, polypropylene's limpness keeps it from being used interchangeably.

Enjay has gone far in developing **monofilament rope** from its Escon polypropylene. With 200 Esso tankers plying the high seas, ample encouragement was available. Polypropylene rope floats on water, is far stronger per lb than hemp and reasonable in cost. Monofilaments of polypropylene do not bond well enough to be used in tire cord.

Injection-molded products coming up include **telephones**. Here absence of perspiration odor and lipstick stain absorption — a disadvantage of cellulose propionate — are causing the shift to polypropylene.

TV and radio cabinets molded of polypropylene have higher heat-distortion resistance.

Enjay's search into the appliance market has pinpointed

dishwashers as least saturated — in other words, major efforts are not yet aimed at the highly competitive replacement stage. Here, polypropylene's resistance to both heat and detergents stands it in good stead for the estimated 1.15 million pounds. With **dryers**, Polypropylene is expected to displace vitreous enamel.

Not generally realized is the proximity of a volume market (150 million/month in U.S.) for disposable **hypodermic syringes** which in production can be gas-sterilized. Polypropylene is a leading contender because of its inertness to the gas. It can also be steam sterilized (250°F.)

Hospital ware are already being made in increasing quantities of polypropylene.

Last year, polypropylene hit the 20-million-lb mark. This year, with the Enjay-Spencer marketing teams separately adding their separate forces to the marketing scene, the level is bound to take a pronounced jump.

In one area Enjay is non-committal. This has to do with multifilament fibers for textiles. Apparently Enjay is awaiting developments in the tough dyeing-problem situation before making known its position.

"Tailored" Polymers Ahead?

Even while pushing polypropylene, both Enjay and its new (since May 31) parent Humble emphasize that manufacturing and marketing efforts are intended as strictly for broad-spectrum polyolefins. Enjay's president John E. Wood III cites as an undesirable example the way polyethylene's resistance to soaps

and detergents was sacrificed when its melt index was increased for easier processing. Enjay's plan calls for "tailoring" polymers, if necessary, to have the optimum set of properties for the application.

Giving the customer just what he needs calls for flexibility up and down the entire setup — and ending with the plant. The plastics business is inherently mobile. Manufactured lots are small, often to changing specs, and frequently ordered for 24-hour delivery. Add to this a variety of tailored polymers and it can be seen that a still greater demand for flexibility must be met.

In anticipation of these needs, Esso research and engineering and Humble engineers devised a continuous-but-flexible polymerization plant, recently started up in Baytown. Here a number of reactors take the place of a single large unit. Production rate can be doubled or tripled by switching in additional reactors.

Process used is basically Zeigler low pressure, same used for polymerizing ethylene, except that Esso R & E scientists at Linden, N. J., made major improvement in the titanium alkyl catalyst, increasing its activity by 10-fold. Then the process was piloted at Baton Rouge.

Plant was designed and built by Humble's own engineering staff.

While the pilot plant was being used for process evaluation, more than 90 tons of polypropylene from it was sent to the market development laboratories at Linden. Thus, by the time the plant was on stream, a broad pat-

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An open letter from --

Donald A. Dahlstrom

Vice President
and Director of Research & Development
The Eimco Corporation

Should you expect free engineering from an equipment manufacturer or engineering contractor?

Not if you use it to build specifications for open bidding, and
award job to firm quoting lowest



Sirs:

In the recent article entitled "The Intriguing Problem of Reducing Process Plant Costs" (May CP, p. 21) you have probed some very excellent points. CP's readers might be interested in a few comments which are based on my own experience with such matters.

First, let's consider your statement about purchasing agents knocking prices down. This is an extremely important problem. Today, too many companies are employing this method. (In fact, some companies pay commissions to their purchasing agents for the amount of money they save by knocking the price down after it is first bid.)

I fail to see the logic in this approach, as it destroys mutual confidence, respect, and assistance between two parties that need each other's help to achieve optimum success. If the reputable equipment manufacturer is willing to engage in such a game of "Russian Roulette," sooner or later he is committing suicide. If, for example, the equipment you are manufacturing costs \$10,000 to build, including overhead and a reasonable profit, and if you must sell it for \$9000, many things can happen.

First, you can produce a cheaper piece of equipment — which

all too often happens and does not give the service the customer wants.

Second, you have to cut out some of the services such as field service, presales, research and development.

With the growing complexity of modern processing technology, I don't think industry gains anything by either alternative. In fact, they lose.

There are today few companies that have staff specialists who know as much about unit operations as do the respective equipment manufacturers concerning their particular type. If this quality (of engineering service to the buyer) is not maintained, either the operating company will have to maintain specialists or else there will be insufficient advance in equipment technology. I am sure it would be the latter.

There are points on both sides. I think, however, the equipment purchaser must be more realistic in his dealings with the equipment manufacturer as well as the engineering contractors. He must value these firms' know-how in what he is requesting of them. If he expects to first get this know-how for nothing and then have everyone bid on specifications developed by such individuals, with the job to be awarded to the low-

est bidder, he is making a very serious mistake.

The only solution as far as the offended firms are concerned is to no longer allow such a customer to have this know-how. Therefore, in the long run he has seriously lost by a foolish and what I would call unethical decision.

I think your last paragraphs hit the nail right on the head. What is needed is a great deal more of cooperation and coordination as well as understanding between buyer and seller. While there is merit on both sides, I think if it is reduced to its simplest terms, the decision is very easy.

Business practices should basically be no different than one's own personal life. You would not go to an architect and ask him to design a house and then turn around and tell him that you are going to put his plans out to bid and, *if he quotes the lowest price*, then he can be paid for his design work, plus supervising the job. Obviously, anyone else could easily quote him a lower price as they have not spent any time at all in design and all they have to worry about is the price of supervising.

You can immediately see that the architect would be committing business suicide by agreeing to such a case.

Over-design on Capacity An Expensive Luxury

Next, let's look at another point brought out in your article: the tendency to over-design on capacity in many industries. This stems from several standpoints.

First, safety factors are often applied to safety factors to such a degree that design capacity increases to 130-150% or even more of actual desired capacity. Second, tradition may be followed in many cases, to result in too much surge capacity (in the form of unnecessary or excessively large surge vessels) being installed into the plant.

I could give you some excellent examples of this if I were at liberty. In so many cases, these surge capacities were installed so that the operator would be essentially relieved of all operating responsibility — simply take life easy. Or earlier methods were followed even though new equipment developments made these unnecessary.

In one case that comes to mind, design of a particular processing step had been done in a more or less conventional fashion for the type of process. After we had finished this, the chief engineer said, "Now let's design a real streamlined job to do this." This

DR. DAHLSTROM speaks from a wealth of world-wide experience in application of filtration equipment. He administers Emco's R&D center at Palatine (Chicago suburb) Illinois. A chemical engineer, Dr. Dahlstrom was at one time a professor at Northwestern University. He is a national director of the American Institute of Chemical Engineers.

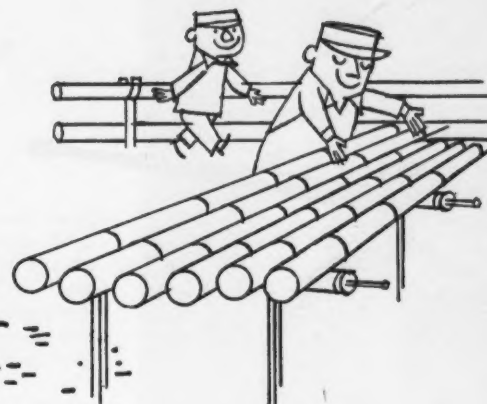
shocked me, as he had said, in response to our original studies, that he had not wanted any streamlining.

Now he justified his change of mind with the explanation that the cost of a new plant was now so high his company could no longer build new plants at the present cost per ton of material produced per day and be competitive. They simply had to chop out a great deal, and surprisingly enough, most of their plant cost was in floor space, pouring concrete foundations, installation costs, etc. In other words, *equipment price was not the deterrent.*

Furthermore, he stated that "on this next plant, the operators are going to have to operate the plant. The plant will not be installed with unnecessary surge capacities, will combine present separate steps as much as possible, and we are simply going to have to learn how to operate without these luxuries. What's more, I am sure it can be done."

When management lets engineers loose on a project like this, it is amazing how many processing steps, surge capacities, etc., can be eliminated, plus the tremendous amount of streamlining that can be done. It's safe to say that floor space, capital investment and operating costs were reduced 60% in the case cited. Furthermore, nothing was sacrificed in quality.

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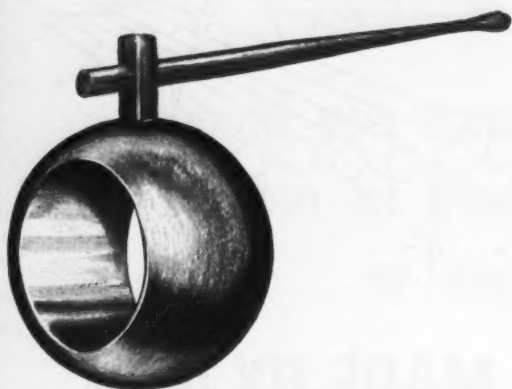
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Check 3657 opposite last page.

'Cinderella' ball valves strike it rich in CPI



Ball Valve Symposium

Original seed for this story may have come from the keen reader interest our editors noted on a case history story carried on ball valves in April 1959. Display of 12 different types of ball valves at the Chem Show in New York City last December brought increased editorial attention.

Talks with engineers at an AIChE meeting confirmed the feeling that the ball valve represented an important development. Definite plans for this story gelled shortly after a CP editor visited a pharmaceutical plant a few months ago. Here he heard of a symposium to be conducted on ball valves to help engineers at the plant use them to maximum advantage. It is hoped that this article will also serve as a symposium to point out how this major engineering development can be used to advantage in the CPI.

GORDON WEYERMULLER and GEORGE BANGS
Associate Editor Assistant Editor

A late-blooming love affair between the chemical industry and ball valves is causing a revolution. Industrial sales of these valves have boomed from roughly \$5 million in 1959 to an estimated \$20 million in 1960. Typical of this boom is the success story of three young men who started producing ball valves in 1956 with a paid-in capital of \$15,500; their business will gross about \$5 million in 1960.

As can be seen in the graph of Fig. 1, a big increase in industrial, not military, markets has been the prime mover in pushing sales upward. A hefty portion (about 75%) of these industrial sales are to the CPI.

With this CPI acceptance, industrial ball valve sales should reach \$35 million in 1961—seven times the 1959 total. In contrast, the military market seems to be leveling off—leaving the chemical-processing industries as the major customer.

If industrial ball valve sales continue to rise at a rate of \$15 million per year, the total market by 1963 will be about \$70 million—still only 3.5% of the \$2 billion total valve market expected by then. Therefore a \$100 million industrial ball valve sales total in the not-too-distant future appears to be quite possible. It is interesting to note that some brokers have recommended stock

Known but ignored since the time of the Caesars, the ball valve has suddenly emerged as a glamour girl of American business. First spotlighted by their use in missiles, these valves in industry have now rocketed from \$5 million sales in 1959 to a \$20 million place in the sun this year with resounding acceptance in the world of chemical processing

of certain ball valve companies as having excellent growth possibilities.

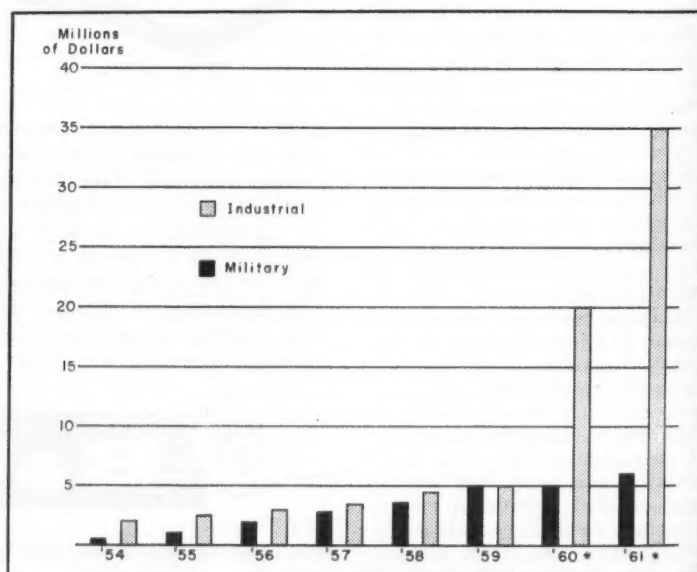
Advantages — There is good reason for the welcome mat laid out by the chemical industry for ball valves. Technical men not familiar with the singular combination of features possessed by the ball valve (see Fig. 2, p. 36)

would do well to investigate it as a possibility for both new and replacement valves in their plants.

Designs of course vary with the manufacturer, but practically all share the following advantages:

Full flow — The full-line-size opening of a standard-OD ball valve results in no more pressure drop or turbulence than would occur in a pipe section of same length.

Fig. 1 — Ball Valve Sales Skyrocketing



*CHEMICAL PROCESSING estimates.

Tight shut-off — The resilient elastomeric seals of ball valves contribute to their highly leak-proof characteristics. With a ball valve in closed position, upstream pressure is in direction of valve closing, thus insuring tight seal.

Quick opening, closing — Ball valves require only 1/4 turn from tight shut-off to full-flow. This has added advantage of giving visual indication of whether or not valve is open.

Since it is not a displacement-type valve, less torque is required for opening and closing it than with some other types. Wiping action of seats against ball precludes jamming. Because of these characteristics, ball valves readily lend themselves to automatic operations.

In addition to these basic features, most ball valves require no lubrication. This is a decided advantage when contamination is undesirable. Also, this no-lubrication feature, and the fact that reseating is rarely necessary, reduces maintenance. Ball valves are in general capable of operating with cryogenic fluids such as liquid H₂ at pressures to 10,000 psi.

Ball valves are still being "pooh-poohed" as only available in small sizes of one or two inches, selling for a few dollars each and only for specialized uses. However, ball valves in diameters up to 36" are on the market. Ball valves selling for \$10,000 or more have already been made.

Limitations — Of course, ball valves are not the be-all and the end-all of the valve world. Good as they are in the proper applications, they do have their limitations:

Throttling — Ball valves can and are being used in many throttling applications. However, they have a higher pressure drop than do some other types of valves. Primary failure in throttling operations is wear on ball section of valve by impingement of liquids and slurries against leading edges of ball.

Temperature — Because of necessity of elastomeric seat and seal materials, ball valves are not suitable for extreme high-temperature service. In general for normal operations they can be used in -425 to +450°F range. This limit is set by the elastomeric materials used for seats.

Two other lesser difficulties were reported. In one case, a plastic material being handled by ball valves formed a coating on ball of valves. This necessitated frequent cleaning to maintain operability of valves, thus raising maintenance expenses. In some designs, when a ball valve is closed, product being handled lodges in its cavity. Such valves might not be suitable for certain applications.

How about costs? For the same service and line size, a metal ball valve is more expensive to manufacture than would be a metal valve of most other types. Of

course, original price is not the whole story with valve expenses. Service life and maintenance are also major factors.

How It All Began

Ball valves are not new. Such valves are believed to have been used by the early Romans in Pompeian aqueducts. They later popped up in the early American samovar.* During the years that followed, ball valves existed only as patent-file oddities.

Practical industrial ball valves as we know them today are, of course, quite new. With such a design known for so long, why wasn't a workable industrial version of the ball valve developed sooner? One problem in the early days of American industry had been that it was not possible to economically produce a sphere to the tolerances necessary for a good ball valve. The development of refined manufacturing techniques overcame this difficulty.

The big stopper, however, was the seating problem. Every material tried had either worn too rapidly or caused excessive friction and binding.

Teflon Is Missing Link

Development of Teflon changed this picture to fill-in the missing link in practical ball valve refinement. Teflon is an ideal seating material. It is semi-elastomeric, yet provides a hard seat which resists wear and causes relatively little friction. At the same time Teflon gives an excellent seal.

The stage was thus set for the

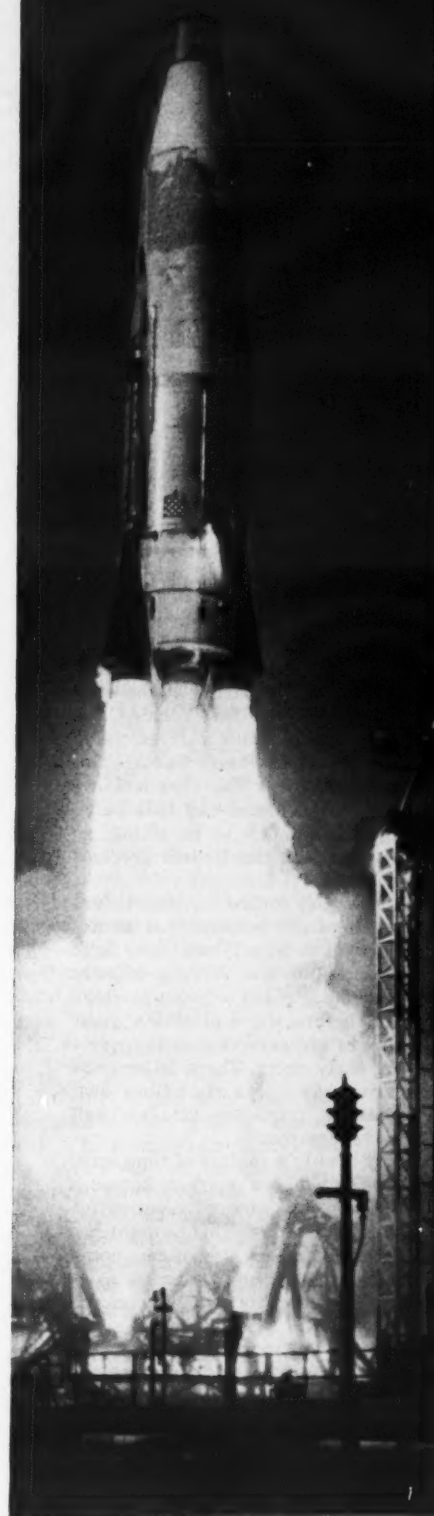
*The samovar originated in Russia. It is a metal urn used in making tea. Water is heated by burning charcoal in a pipe which passes through the urn.

CPI Ball Valve Entries

To-Date

Rockwood Sprinkler	Worcester, Mass.	1945
W-K-M	Hanstan, Tex.	1952
Hydril	Los Angeles, Calif.	1953
Jamesbury	Worcester, Mass.	1955
Hydromatics	Livingstone, N.J.	1956
Worcester Valve	Worcester, Mass.	1956
Chemtrol	Santa Ana, Calif.	1957
Rockwell Manufacturing	Pittsburgh, Pa.	1957
Hills-McCanna	Chicago, Ill.	1959
Cooper Alloy	Hillside, N.J.	1959
J. L. Putnam	South Portland, Maine	1960
Colonial Plastics Mfg.	Cleveland, Ohio	1960
Wm. Powell	Cincinnati, Ohio	1960
Tube Turns Plastics	Louisville, Ky.	1960
Pacific Valves	Long Beach, Calif.	1960

An Atlas missile takes off from its launching pad. Ball valves are playing an important role in missiles such as this. Hydromatics valves recently made for a space application operate in 300 milliseconds at 5000 psi. (Photo courtesy North American Aviation, Inc.)





Ball Valves Boom in CPI

From preceding page

revolution to come. An established old-line company was the first to enter the ball valve field, via a U.S. Navy contract during World War II. Taking their cue from this concern, several newcomers sprang into operation in the early fifties. Most of these firms began with the blessing of a Government contract for the valves in submarine, jet-aircraft or missile applications.

CPI Market Invaded

The pioneering spirit and imaginative promotion of these firms in the early days solidified the ball valve beach-head. With military and space success under their belts, they found it just one short step to major invasion of the industrial market — headed up by the chemical processing industries.

The CPI was virgin territory indeed; ball valves were a thing virtually unknown to it. The offensive hit full stride at the 1959 Chem Show in New York's Coliseum where about a dozen valve makers plied their wares. The rest is history. The chemical industry has found the ball valve a product much to its liking, as witness the sales figures graphed in Fig. 1.

The rosy future for ball valves can logically be expected to attract new blood into the field. Several old-line valve producers have made plans to begin production before the end of the year. Others are seriously contemplating early entry. These latter concerns may either start their own lines or purchase smaller ball valve companies.

It is only a matter of time until the ball valve market becomes considerably more competitive than it is today. This thought has given some of the older companies cause to ponder. A sales manager with one major concern feels that, "Most certainly . . . there are more manufacturers getting into the business than the market will support."

Rockwood Sprinkler

Although there is some difference of opinion as to which company is the pioneer, Rockwood Sprinkler Company, Division of The Gamewell Company, is generally credited with being the first concern to introduce industrial ball valves. This firm originally developed ball valves in connection with work done for the U. S. Navy. In 1945 ball valves with synthetic plastic seats were introduced, and in 1950 the company developed a top-entry model. They are available in standard sizes of $\frac{3}{8}$ through 10" in a variety of metals and seat materials.

W-K-M

W-K-M, Division of ACF Industries, Incorporated, began producing ball valves in 1952, with emphasis on the non-lubricated feature to protect product purity. Typical products handled are gasoline, LPG, synthetic fuels, penetrating gases, alcohol, caustic, butane and propane. In one installation, 150 of the valves are handling propane gas within a range of 20" Hg vacuum through 600-psi pressure without leakage. Sizes in full-pipe-area style range from one through six inches. Reduced-area ball valves are also made.

Hydril

Hydril Company placed its ball-plug valve on the market in 1953. It has a free-turning, bearing-mounted spherical plug. A feature of the valve is its me-

Ball valve pioneers

The ball valve business has an interesting history that can be amplified by telling of the part played by each company in the past, explaining its present program and outlook for the future. The center of activity of ball valves has been the northeastern part of the United States. Let's see how it developed —

chanically compressed gasket-type seal. It has a reduction-gear drive on handwheel. Unit is available in sizes of 2 through 12". The valves are being sold for oil-field drilling, petroleum refining, pipelines and chemical processing.

Jamesbury

Howard Freeman resigned as director of research and development of Rockwood Sprinkler in 1953 to organize Jamesbury Corporation — one of the two largest companies in the field. The following figures on net sales (to

nearest \$1000) indicate the rapid growth of company:

1955	\$ 35,000
1956	297,000
1957	835,000
1958	1,384,000
1959	2,174,000
1960	5,000,000

Jamesbury ball valves are available in sizes of $\frac{1}{4}$ through 10", in bronze, carbon steel, Monel, stainless steel, aluminum and PVC. Seating materials include Teflon, Nylon, neoprene, Hypalon and natural rubber. Pneumatic, hydraulic and electric-motor operators are available.

Market for the company's

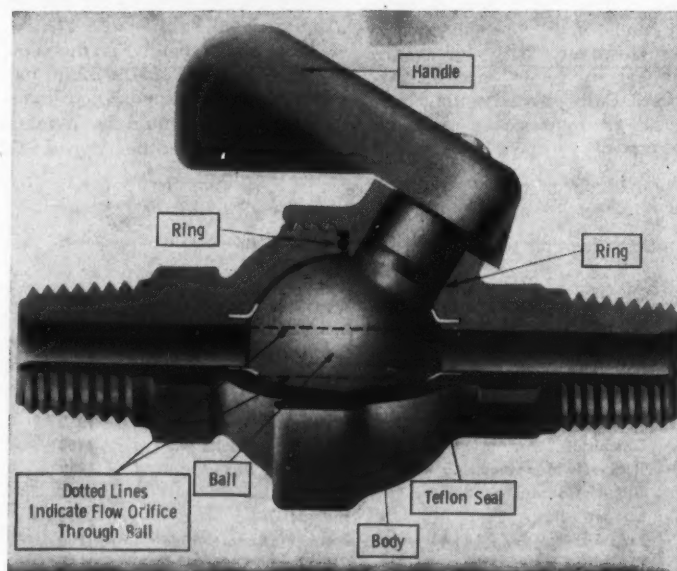


Fig. 2 Although ball valve designs differ somewhat from company to company, the plastic model shown here demonstrates principles common to all variations. (Drawing courtesy Chemtrol)

valves includes chemical processing, original equipment, metal industries and atomic submarines. Certain aspects of their ball valve design are protected by patents. Stock is selling for \$21 over-the-counter at this writing.

Hydromatics

Hydromatics, Inc. was founded in 1956 by Bernard L. Moss, Harrison J. Britton and Bernard Seid with a paid-in capital of only \$15,500. The company is expected to do about \$5 million in business during 1960.

They recently produced eight stainless steel ball valves weighing up to five tons each for a 1.5-million-lb-thrust rocket. The valves operate in 300 milliseconds at 5000 psi.

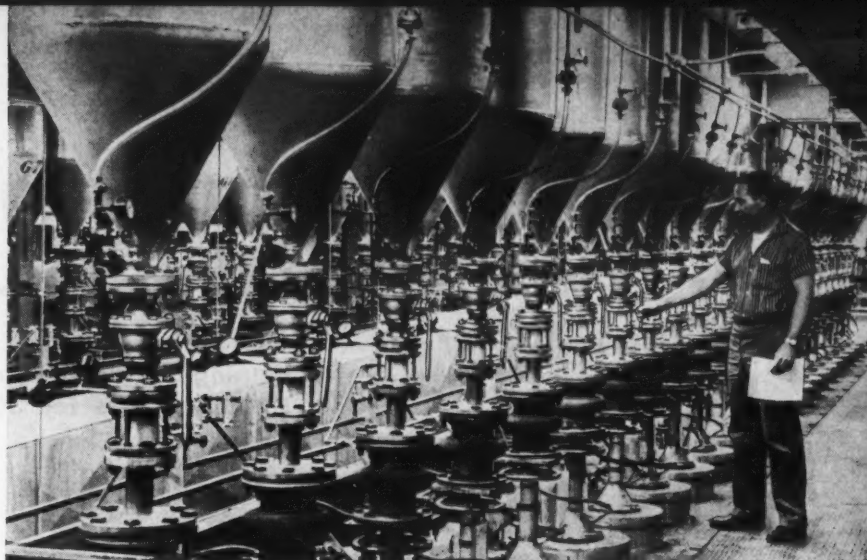
In late 1959 Hydromatics started to emphasize industrial ball valves, in addition to those for military purposes. Valves are being produced in stainless, carbon steel, semi-steel and aluminum, with Teflon seats. Sizes vary from ½ to 14". A feature of the valve is the manner in which ball is positioned between two non-lubricated bearings to absorb impact and shock. Company's profits rose from 25¢/share in 1957 to \$1.00 in 1959. Common stock offered at \$10 in December 1959 is selling at \$24 over-the-counter at this writing.

Worcester Valve

In 1955, Earl T. Harper, owner of Worcester Forged Steel Valve Co., Inc., turned the management of the company over to Homer E. MacNutt Jr., age 28, and Robert C. McCray, age 29.

Decision was made almost immediately in 1955 to go into ball valves. The Worcester valve has

These Type-316 stainless steel ball valves handle Nylon pellets as they come from supply hoppers in a large southern textile mill. (Photo courtesy Rockwood Sprinkler)



three major components: a center section and two identical pipe ends. Center section contains all working parts. It can be easily removed from line, thus simplifying maintenance.

The company is now known as Worcester Valve Co., Inc. About 50% of their valves are going into the chemical-processing industries, 5% in atomic energy, 10% to the U.S. Navy and remaining 35% to a wide variety of users. It is estimated that 1960 sales will be \$3 million.

Chemtrol

Chemtrol, a company making complete plastic pipe systems, was founded by Martin Usab in 1956. He had designed a plastic ball valve before the company was formed. They started manufacturing ball valves in late 1957 and will have sales of more than \$1 million on this item in 1960. Chemtrol believes they are the largest manufacturer of plastic ball valves. A number of similar types of plastic valves are made. Chemtrol valves are sold by B. F. Goodrich Company and Crane Company.

Chemtrol's design incorporates a floating ball which seats itself automatically against Teflon. Two compensating nuts at either end of valve tend to work as unions. This permits easy removal of valve. The valves are made in PVC, acrylonitrile butadiene styrene, polypropylene and Penton. Sizes vary from ½ through 4".

The chemical-processing field is the largest user of these plastic ball valves, followed by electronics, water treating, film proc-

essing, atomic energy, food, submarines and aircraft. A Penton ball valve has successfully handled concentrated HNO₃ and HCL at 160°F for two years with no trouble.

Rockwell Manufacturing

Atchison Division of Rockwell Manufacturing Company put their version of the ball valve into competition in 1957. These Hypersphere ball valves are pressure-lubricated — an unusual feature for a ball valve. They are now being produced in 12 through 36" sizes.

Hills-McCanna

Hills-McCanna Company, a concern that was in business before the Chicago fire, started producing ball valves in 1959. Sales for 1960 will be three times that of 1959.

Two lines of ball valves are being made, one of which offers top entry. They are satisfactory for service to 350°F and 1000 psi. The chemical processing industry is considered to be a prime market for the valves. Valves are available in cast steel, bronze, stainless, ductile or cast iron or special alloys, in sizes from ¼ through 6".

Cooper Alloy

Another of the long-established valve producers, Cooper Alloy Corporation, began making ball valves in late 1959. Features of their valves are full-port opening, union-end connections and a positive rectangular cross-

slotted key in ball. They are available in stainless.

This company expects that 97% of its market will be in the chemical-processing field, with 3% in missiles and atomic energy.

Tube Turns Plastics

A top-entry plastic ball valve was recently brought out by Tube Turns Plastics, Inc. The valve is available in UPVC and Penton, with socket, threaded or flanged ends. It incorporates Teflon seats.

Pacific Valves

Another old-line company, Pacific Valves, Inc., this year joined the ball valve club. Their version incorporates a floating-ball design. It is available in a variety of standard materials in sizes of ¼ to 10".

Other Companies

J. L. Putnam, who was with Jamesbury Corporation, formed The J. L. Putnam Company, Inc. in late 1959 to produce ball valves. The Colonial Plastics Mfg. Co., Subsidiary of The Van Dorn Iron Works Company, recently started selling plastic ball valves. The Wm. Powell Company is manufacturing ball valves in 1, 1½ and 2" sizes. Allis Chalmers Manufacturing Company makes a large ball valve for water works at its plant in York, Pa.

(Technical literature available on ball valves is described on p. 138 of this issue.)

NEXT MONTH

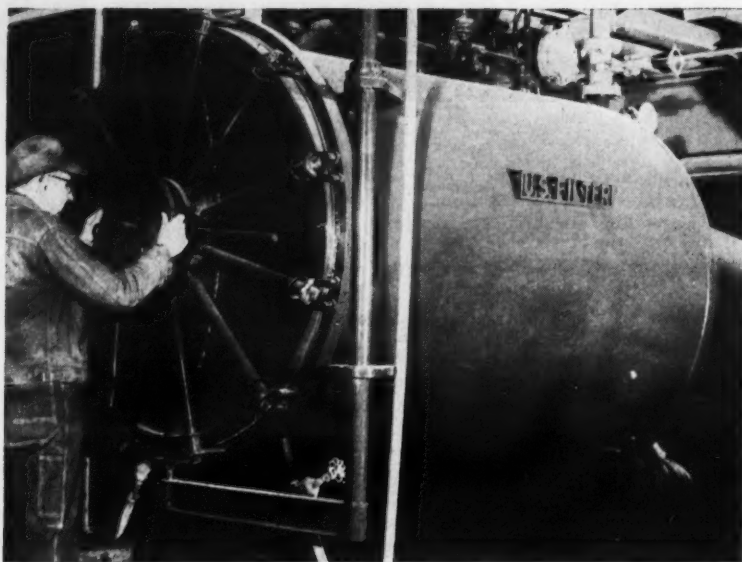
In next month's CP, a different type of ball valve—the Paul valve—will be featured in the Plant Engineering, Maintenance & Safety section.



NEW SOLUTIONS
of processing problems

Brine filtration goes semi-automatic downtime plunges, clarity climbs

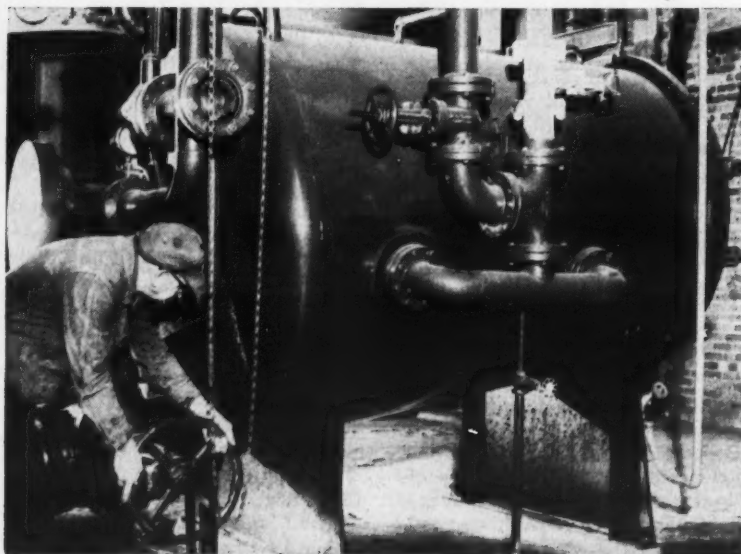
Cleaning shutdown time slashed 95%, maintenance costs are \$2000/yr less for 300,000-gpd pre-cell polishing system



Photos by CP Staff

A few turns of handwheel quickly opens or closes filter's door for inspection

Opposite side of automatic washing filter. Easy-to-operate valve on bottom of unit flushes cake directly into plant's disposal system. Leaves inside filter rotate at three rpm during sluicing operation



TED F. MEINHOLD, Associate Editor
with **J. T. FERGUSON**, General Superintendent
Electrochemical Department
and **R. L. SUTTMAN**, Process Engineer
Diamond Alkali Company

Problem: Brine filtration was a difficult and expensive operation at Diamond Alkali Company, Painesville, Ohio. The three bag-type filters used for the task required excessive attention to keep functioning efficiently.

Mechanical maintenance ran over \$1500 per year. Another \$1000 was spent for bag and leaf replacement. To insure minimum downtime when trouble was encountered, it was necessary to keep a sizeable inventory of bags and leaves on hand.

Cleaning the filters was a tedious and time-consuming job. Done about once a week, it required a minimum downtime of six hours per unit.

Two filters operating continuously could process approximately 300,000 gal per 24-hr day. The third served as a spare, ready for use when needed. Each unit had 30 three-foot-diameter bronze leaves, and a total of 1000 sq ft of filtering area. Body of filter was constructed of cast iron. (Use of the two different metals was also source of trouble. Current feeding back from chlorine cells caused a severe electrolytic condition which attacked filter leaf surfaces and prevented tight seals.)

Do Polishing Job

Company uses the brine to produce chlorine in electrolytic cells. Filters polish the

corrosive solution coming from clarifiers before being sent to cells. Turbidity of filtered brine varied between 20 and 100 ppm. It is imperative that good clarity and constant flow be maintained at all times. Any interruptions in this respect have an adverse effect upon cell operation.

Solution: A semi-automatic filter was installed that permits filtrations to be conducted continuously with minimum effort. Unit is equipped with 23 specially-designed sluicing jets for fast, automatic washing. It is not necessary to open filter for cleaning. Sluicing is semi-automatically controlled.

The horizontal, pressure-leaf filter has a 7½-ft-long PVC-lined tank. Leaves are circular (there are 22 of them), measure four ft in diameter and have polyethylene screens. Unit has total filtering area of 500 square ft.

Leaves are mounted on a Monel shaft that permits them to be rotated during the washing cycle. Sluicing jets are located above filter leaves. Each jet directs a 50-60-psi split spray of water against front and back of the two leaves it serves.

Leaves revolve slowly (three rpm) insuring that entire surface of each leaf comes into contact with wash spray. Cake is removed through V-shaped trough in bottom of filter. An easy-to-operate valve on bottom of filter empties slurry directly into plant's

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NEW SOLUTIONS

disposal system.

Filter has quick-opening door equipped with spider-wheel lock mechanism. There are no nuts or bolts to fuss with. A few turns of the handwheel opens or closes the door in short order.

Only one part-time operator is required for the unit. For precoating, approximately 50 lb filter aid is mixed with 1000 gal brine and passed through unit. Filtrations are conducted at 20 to 45 psi. Brine at room temperature is forced through filter by means of a centrifugal pump driven by 15-hp motor.

Results: The pressure-leaf filter performs the brine polishing job smoothly, efficiently, and economically. Maintenance costs, which formerly amounted to over \$2500 a year, are now less than \$500 — a slash of 80 percent. Periodic inspection and lubrication are all that is needed. With these savings, filter is expected to pay for itself in five years.

Cleaning has also been greatly simplified. Conducted about once a week, this takes only one-half hour (includes precoating) instead of 12 hours required with two bag-type filters — reducing downtime by over 95 percent. Process water is used for back-washing. Cake thickness is usually about one-quarter inch. Consisting mostly of calcium carbonate and magnesium hydroxide, product weighs approximately 75 lb per cu ft (wet basis).

Boosts Brine Clarity

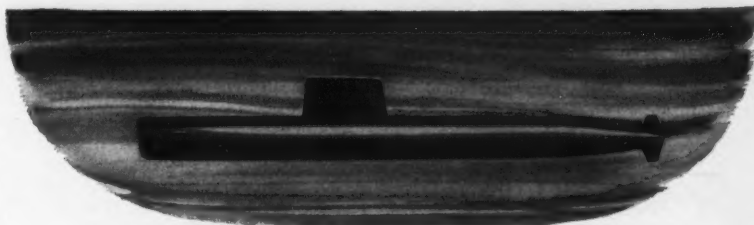
The desired throughput of 300,000 gpd is easily maintained with the single unit. Brine clarity has also been improved. Turbidity of filtered product is less than 10 ppm — compared to 20-100 ppm formerly obtained.

No difficulty in maintaining this high clarity has been experienced, except under adverse conditions when precipitation in the clarifiers goes out of control. Whenever this happens, a very fine colloidal precipitate forms which is difficult to filter. Bag units usually had to bypass part of

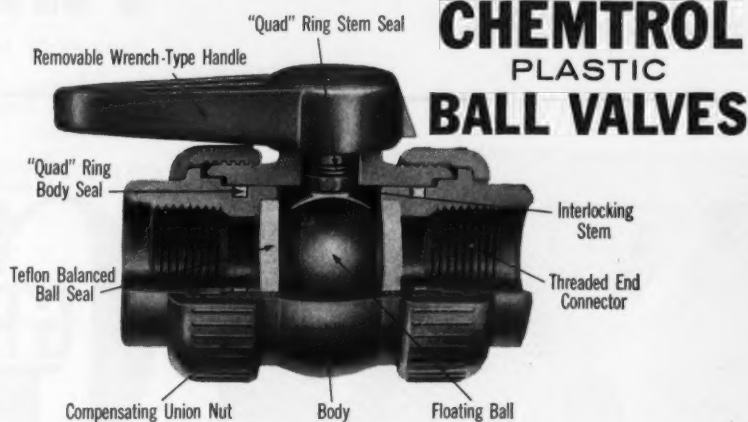
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way to cut replacement costs and maintenance in operations involving acids, alkalis, many solvents. Available in 5 basic plastic materials, many valve types and an extensive size range.

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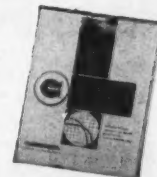
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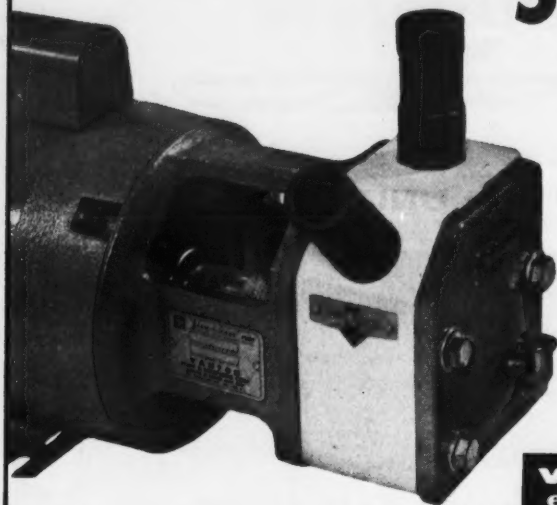
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Check 3658 opposite last page.

Check 3659 opposite last page.



SEALLESS PLASTIC PUMPS

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Vanton self-priming, non-agitating, Flex-i-liner pumps have no troublesome shaft seals, stuffing boxes, gaskets or check valves; they do not leak or contaminate; have a longer pump life and require little maintenance under even the most exacting process applications.

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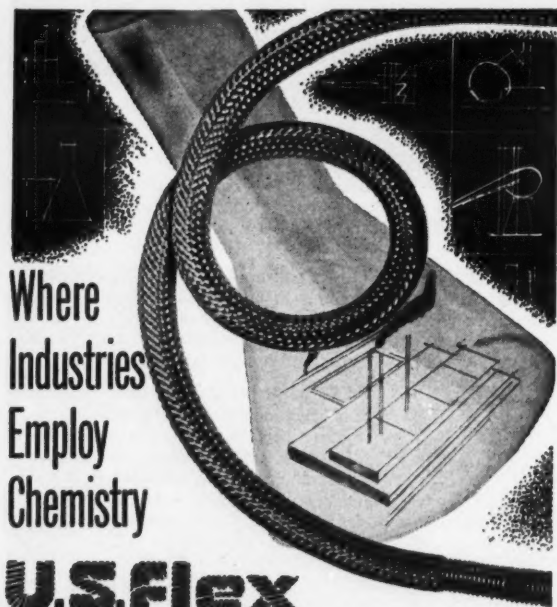


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GRAVITAIN

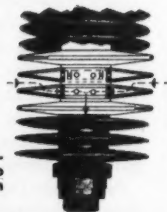
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NEW SOLUTIONS

flow when this occurred. With pressure-leaf filter, only closer operator attention is required under these conditions. The fine colloidal precipitate also shortens the filtration cycle somewhat.

(Auto-Jet filters are manufactured by United States Filter Company, 1910 N. Potrero Avenue, El Monte, Calif.)

Check 3663 opposite last page.

HF vapors at 300°F handled 24 hr per day by heat exchanger

Highly corrosive hydrofluoric acid vapors are being superheated from 150° up to 300°F by use of a nickel alloy tube heat exchanger at AEC's uranium processing plant in Weldon Spring, Missouri. Unit has been operating continuously since April 1958 without any major maintenance.

Passage through the heat exchanger prepares the vapor for reaction with uranium di-



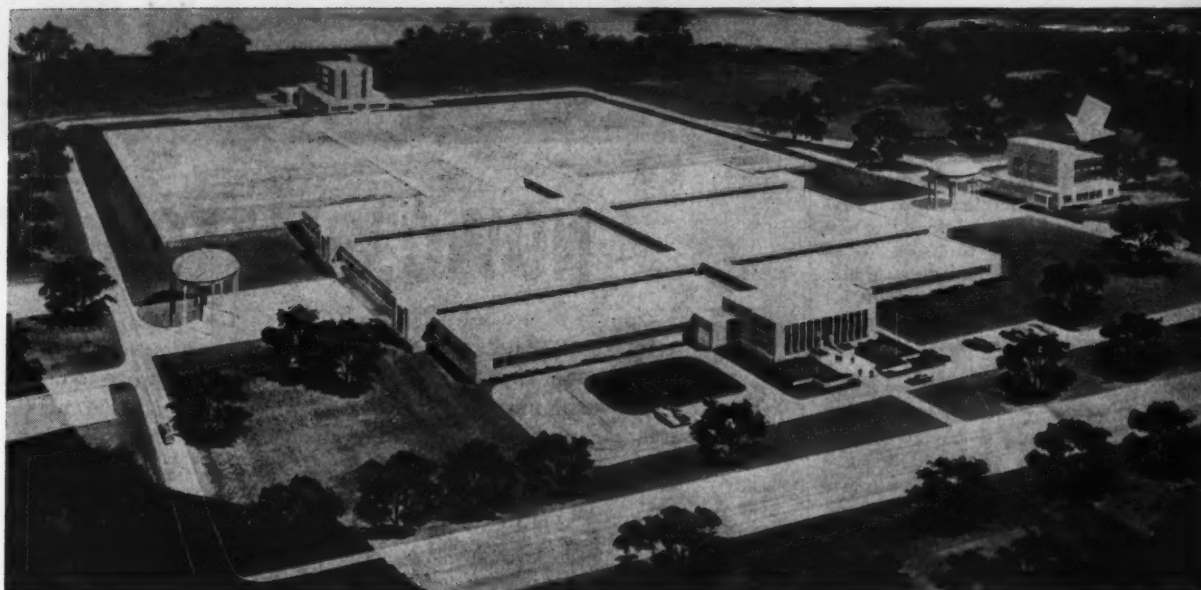
Plant engineer inspects heat exchanger which has been processing corrosive HF since April 1958

oxide in the next process step. This forms "green salt," or uranium tetrafluoride, which is then further refined into pure metal.

The heat exchanger is a two-pass shell-and-tube unit equipped with Inconel tube. The plant is operated for the AEC by Mallinckrodt Chemical Works.

(Heat exchanger was manufactured by the Patterson-Kelley Co., Inc., Warren St., East Stroudsburg, Pa.)

Check 3664 opposite last page.



Containerization techniques being utilized in post-treatment plant (arrow) of ultramodern Torresdale facility are accruing savings in package, labor, storage and transportation costs

Pushbutton water purification keyed to containerization

Handling of phosphates in bins—a first in treatment field—helps \$25-million ultramodern Torresdale plant give Philadelphia taxpayers a double bonus: More water, less labor and maintenance costs

PHILADELPHIA taxpayers, tapped for \$25 million to erect the second largest water-treatment plant in the country — the 423-million-gpd Torresdale operation — are reaping some unexpected benefits from containerized phosphate handling in the post-treatment plant.

Torresdale, second only to Chicago's 480-million-gpd facility, incorporates up-to-minute rapid sand-filter treatment techniques in both preliminary and post-treatment facilities. Plant is more than adequate for even peak summer demand of 250 million gpd.

An innovation — for the water treatment field — is the adaptation of containerization techniques for handling phosphates in the post-treatment

plant. Instead of the conventional handling of phosphates in 100-lb multiwall bags with attendant time-consuming slitting, dumping and scrapping of bags, the chemicals are received in 4000-lb-capacity aluminum bins which do three-way duty as shipping containers, storage units and discharge hoppers.

A week's supply of pelleted metaphosphates is shipped to the plant in seven bins on an open flatbed truck from the supplier in Rumford, N.J. At Torresdale, bins are removed from the truck by fork lift at the loading dock; carried by elevator to the third-floor discharge-storage area and double-tiered a few dozen feet from dual discharge stations. The same truck returns empty

bins to Rumford for refilling.

In a matter of minutes, a bin can be shifted by crane into position in a tilting discharge station and a day's phosphates supply dumped into a second-floor dissolving tank. Second bin is kept at ready on alternate discharge station over alternate mixing tank as spare — standard procedure in progressive water-treatment plants to insure against failure of water supply. Spare could also be used if city decided to increase treatment ratio from the present one ppm of phosphate.

Phosphates prevent corrosion in the piping system and minimize "rusty water" complaints from citizenry. Water pH is maintained at 7.5 for top

To next page



Walkie fork truck is used to move bin of phosphates from truck, via elevator, to storage-discharge area where double-tiering conserves space. Bin is positioned (below) by crane in tilting device, preparatory to dumping into mixing tank on floor below. Bin at right has been locked into discharge position



phosphate performance.

From the second-floor dissolving tanks, phosphate mix is incorporated with lime, chlorine and fluoride into the city water supply in eight rapid-mixing basins located under the building. Treated water flows through a prestressed concrete conduit to a 50-million-gal clear water basin and then to users.

Since the Torresdale plant is a new facility, there is little basis for comparison to pinpoint savings realized through containerization.

However, the old Torresdale waterworks required 100 employees, plus a sand-washing detail of 15 to 20 prison inmates. In contrast, the new pushbutton facility requires only 75 employees — rapid sand filters are washed automatically.

So far as the post-treatment building itself is concerned, no employees are assigned specifically to it. Containerized handling functions are performed as supplemental duty by men working in the filter building.

Open truck used for shipping bins permits savings in maintenance over covered trailers. Airtight seal of bins protects hygroscopic pellets from deterioration, allows outdoor storage.

(Tote system of bulk handling, utilizing Tote Bins and Tote Tilts at Torresdale, is engineered and fabricated by Tote System, Inc., Beatrice, Nebr.)

Check 3665 opposite last page.

'Double tank' dissolvers speed nuclear fuel processing at GE

Guard against accidental critical reactions

Problem: More potent fuel elements, containing higher percentage of uranium-235, slowed processing operations at General Electric's Hanford Atomic plant in Richland, Washington. Existing dissolvers could only handle very small quantities of this material safely. Extreme care had to be taken to assure that less

SARCO

NOW... MATCH STEAM TRAPS

THERE'S no such thing as an all-purpose steam trap. That's why it pays to know what each trap has to offer. Here are five examples that demonstrate how you can match the correct steam trap type to the exact requirements of each application.

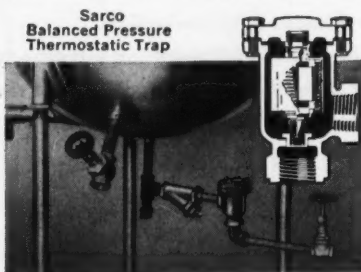


EXAMPLE 1: Outside Tracer Lines: A tough set of requirements

One of the most demanding sets of requirements a steam trap has to face is found in *outside steam tracing*. The trap must not only rid tracer lines of condensate and air immediately they're formed, but it must do so under exacting conditions. Pressures on each trap may vary widely. Installations may be remote and inaccessible to service. Water hammer may be a constant threat; freezing may be a hazard. Only the unique Thermo-Dynamic trap takes all these demands in stride. The Sarco TD-50 operates perfectly without adjustment through its full pressure range of 10-600 psi. It's virtually immune to water hammer and won't freeze when installed with a free discharge. Maintenance is, therefore,

negligible. Compact, requiring no external support, the TD-50 is just about the easiest trap in the world to install. Once it's installed, you can forget it. You can count on an extremely long, trouble-free service life with minimum maintenance attention.

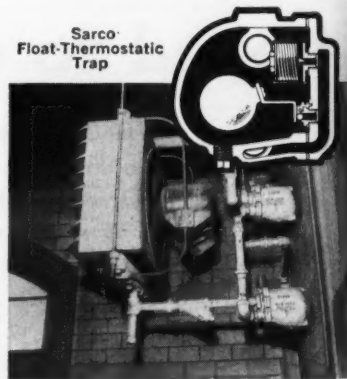
More closely than any other model, the TD-50 approximates an all-purpose trap. However, special application requirements might dictate the use of another type of Sarco trap. Sarco engineers stand ready to help you solve any trapping problems.



EXAMPLE 2: For steam jacketed process kettles: a trap that operates immediately on start-up and self adjusts to both low and high pressures

When a large steam-jacketed process kettle starts up, the condensate load

is high, and all air in the jacket must be released quickly. At this stage, however, the jacket pressure is low; yet it builds up rapidly as the process continues. Because a SARCO No. 9 Balanced Pressure Thermostatic Trap is wide open on start-up, it releases initial air and condensate without the need for a bypass. And because it is self-adjusting, it works just as efficiently during the first processing stage when the jacket pressure is high. There are no seats to change for various working pressures. You can see why it is the obvious choice for steam jacketed process kettles.



EXAMPLE 3: How to prevent water-logging in unit heaters and blast coils

All unit heaters and blast coils have a relatively small internal volume in comparison with their steam condensing capacity. Even slight water-logging can reduce heat output seri-

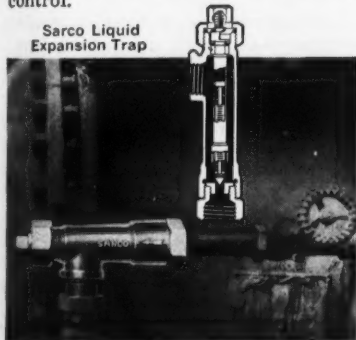
Impartial advice on trapping because
ONLY SARCO MAKES ALL 5 STEAM TRAP TYPES

TOPICS

PS TO YOUR TRAPPING NEEDS

ously. Pressures may vary widely under automatic temperature control and so may the load because of variable demand. A trap to handle this application must adjust itself instantly to pressure and load changes. The most precise answer to this problem is the SARCO Float and Thermostatic Trap—and here's why: it releases air on start-up and during running, and, because it discharges condensate continuously, it does not set up in the system violent pressure changes that would upset close control.

Sarco Liquid Expansion Trap



EXAMPLE 4: How to release low temperature condensate

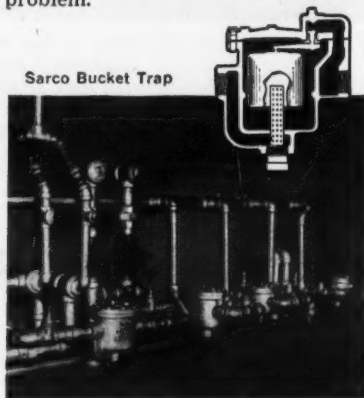
When condensate cannot be returned to the boiler feed tank either because of distance or because it may be contaminated, it's economical to utilize some of the sensible heat as well as the latent heat of the steam.

For this purpose a trap must be capable of releasing condensate to temperatures as low as 100° F.

The sound trap selection here is

the SARCO No. 871 Liquid Expansion Trap because it can be set to release condensate at temperatures down to 100° F. regardless of supply pressure. This performance assures maximum steam economy. The Sarco No. 871 handles the starting load easily because of its wide open valve, which throttles the flow as the condensate temperature rises. Furthermore waterhammer cannot reach the operating element. No other type is as nearly perfect for this specific problem.

Sarco Bucket Trap



EXAMPLE 5: Economic handling of Water Hammer and Corrosive Conditions

In applications in which water hammer or corrosive conditions are encountered but in which low pressures or extremely high back pressures preclude the use of the Thermo-Dynamic trap, the Sarco Inverted Bucket Trap is recommended. While

the Sarco I. B. is not exactly a fuel miser, its relatively rugged construction will withstand considerable water hammer; and, when it is fitted with stainless steel internal parts, it offers excellent resistance to corrosion.

* * *

CONCLUSION: The right application is the economical installation

When you choose steam traps that serve their purpose without frequent adjustment, and without maintenance or replacement problems, you save on down-time, man-hours, spare parts, and production slowdowns.

You can get the money-saving solution to every trap selection problem by consulting Sarco. You get impartial solutions, because only Sarco makes all 5 types of steam traps: Thermo-Dynamic*, Thermostatic, Float Thermostatic, Liquid Expansion, and Bucket.

You also get the benefit of Sarco's 50 years of specialized experience in the manufacture and application of temperature regulators, industrial air vents, pipeline strainers, dial and industrial thermometers, heating and cooling controls, heat exchangers, heating control systems and heating specialties.

For literature or impartial help in solving your steam trapping or control problems, contact your local Sarco Sales Representative, or write direct to Sarco.

1440

*U.S. Pat. No. 2,817,353, T.M. Reg. U.S. Pat. Off.

than a critical mass of material was being processed.

The dissolvers are the first step in reprocessing the spent fuel elements. Units are large cylindrical tanks that perform two functions — 1) dissolve and remove the fuel elements' covering jackets and 2) dissolve the fuel elements themselves.

The resultant solution from the second operation is then passed through a series of complex processing steps



Dissolver shown during construction. Wall of inner tank consists of six inches concrete which acts as neutron barrier

which separates plutonium and fission waste products from unused uranium.

Solution: Safer and more efficient dissolvers were designed to process the higher uranium containing fuel elements.

The new dissolvers are actually a tank within a tank. Fuel elements are placed into a circular metal crib that fits into the outer tank. Wall of inner tank is concrete about six inches thick. The concrete absorbs extra neutrons and prohibits them from crossing over the inner tank to fuel elements on the other side where they could continue their fissioning work.

Results: The dissolvers permit large quantities of the fuel to be processed efficiently without danger of a critical reaction occurring.

(Reactor design and construction work was done at Hanford Atomic Products, General Electric Company, Richland, Wash.)

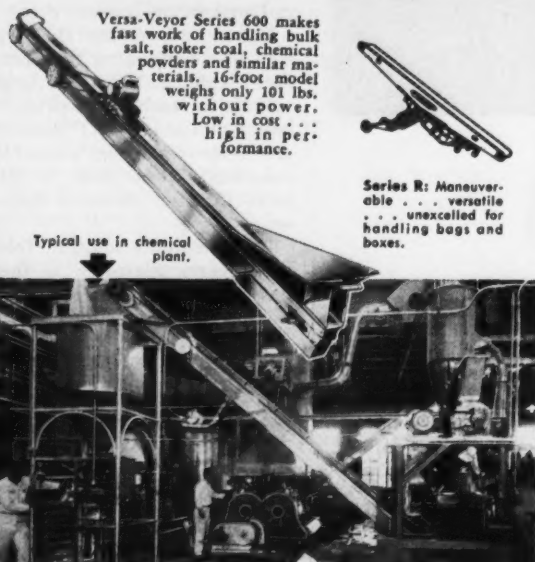
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Check 3666 opposite last page.

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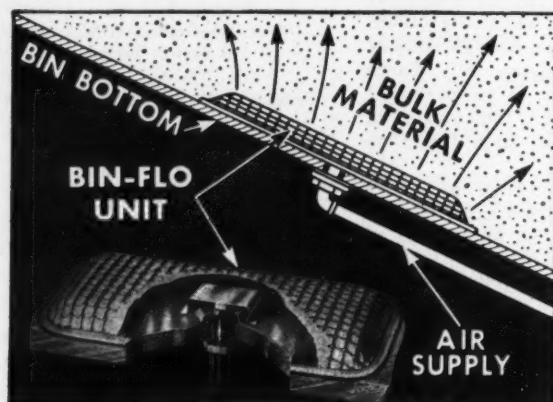


Series R: Maneuverable... versatile... unexcelled for handling bags and boxes.

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Check 3667 opposite last page.



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BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR the original diaphragm-type bin level indicator. In successful use for over 20 years. **ROTO-BIN-DICATOR** new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

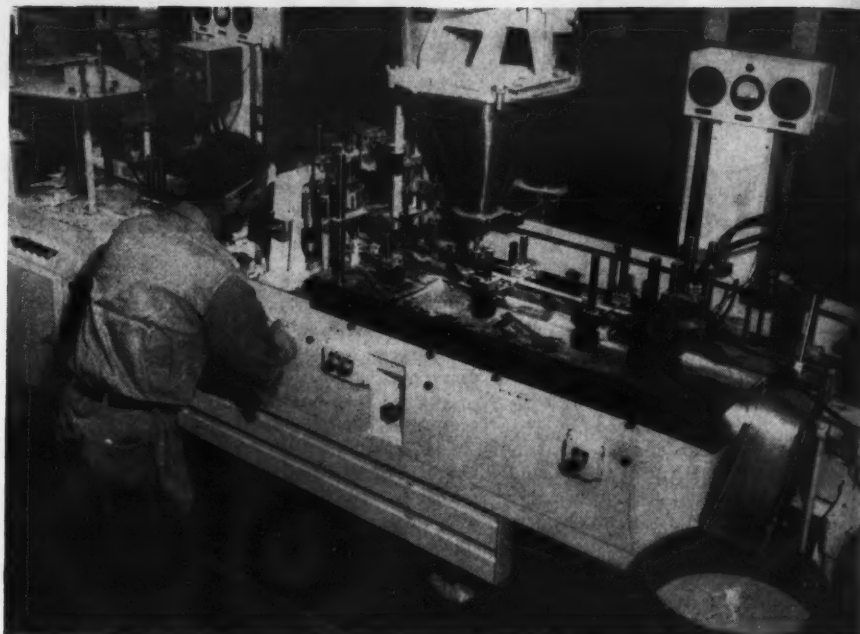
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VALLEY 2-6952

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Check 3668 opposite last page.

NEW SOLUTIONS of processing problems



CP Staff Photo

One of the two envelope-packaging machines at Argyle Packaging. Individual heat-seal packets are formed from roll stock at left, pass through top-opening step (in front of operator), are filled by auger from powder feed hopper. Top of envelope is heat-sealed at right. Full, sealed envelopes drop down chute at far right.

Pharmaceutical packaging costs halved at Argyle

Linear-motion design cuts labor costs, changeover time and maintenance in envelope forming and filling

DANA B. BERG, Executive Editor
with **J. N. McDONALD**, General Manager
Argyle Packaging Company
Division of The Knox Co.
Newark, N. J.

PROBLEM: High maintenance, changeover and labor costs plagued packaging operations at Argyle Packaging Company, Division of The Knox Co., Newark, N. J. Argyle was using a reciprocating-action unit to fill 2x2½" heat-seal envelopes with two tablet products and two powder products — at a rate averaging 65/minute.

Argyle is the "packaging wing" of The

Knox Co., distributors of proprietary and ethical pharmaceuticals, but also does custom packaging for outside companies. One of the main Knox products being envelope-packaged is Amosan, a powder to treat gingivitis and allied gum disorders. This hygroscopic product is packaged in a laminated paper/polyethylene/aluminum foil envelope, about 1.7 gm net in each.

Solution: Company switched over to a linear-motion filling and sealing machine and is now using two of them for the four products being filled into envelopes.

The machine is fed preprinted heat-sealable material from roll, forms individual envelopes by heat sealing bottom and sides at preset spacing and cutting

apart in the center of the side seals.

The envelopes so formed are held by moving clamps which take them under 1) "splitter blade" which opens top of envelope slightly, 2) air jet which blows silica-gel-dried air into envelope to open it further and fill it out; 3) package former which is inserted into envelope to form it for receipt of powder; 4) auger type filler that deposits product, as determined by preset auger-turning interval; 5) heat-sealing envelope top.

When tablets, instead of powders, are to be filled, it is a simple matter to substitute simple rotary-table feeder in place of the powder feed hopper and auger. Normally 8 or 12 tablets are put into each envelope.

Results: Argyle figures that they have been able to cut costs in half in this part of their operations. This is the result of faster production — 105 vs 65 envelopes per minute — and the quicker change-over and lower maintenance realized with the new machine.

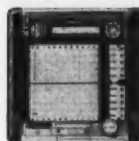
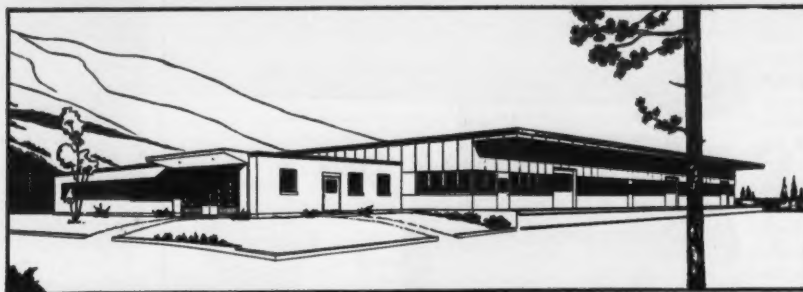
Another big factor is the adaptability of the new equipment to running sample lots of products. It is highly adaptable to different fills, sizes and types of envelopes or other containers.

Interesting sidelight: Argyle packaged 10,000 envelopes on the same day they received the first machine. The close cooperation of the local representative of the equipment supplier had much to do with this. He stayed with the job until production was established.

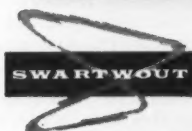
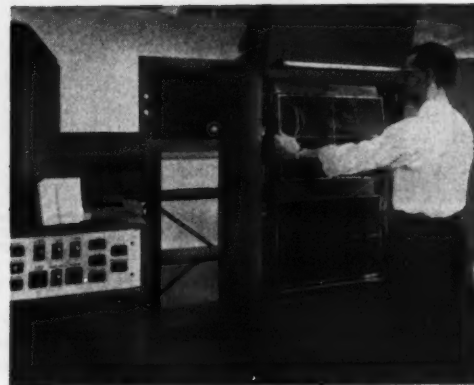
(Automatic packaging machines were supplied by Bartelt Engineering Company, Inc., 1900 Harrison Avenue, Rockford, Illinois.)

Check 3669 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



NEW HOME FOR SWARTWOUT AUTRONIC® CONTROLS. INDUSTRY'S FIRST AND "OLDEST" FULLY ELECTRONIC CONTROL SYSTEMS NOW COME TO YOU FROM THE NEWEST INSTRUMENT PLANT IN THE COUNTRY. Expanded facilities. Improved manufacturing techniques. Computer-automated production and inventory control. These and other recently instituted efficiencies have pushed Autronic production to record levels in record time. Our field engineering staff has been enlarged, too. Service is better all the way around. Now, more than ever before, Swartwout is the leader in electronic process instrumentation.



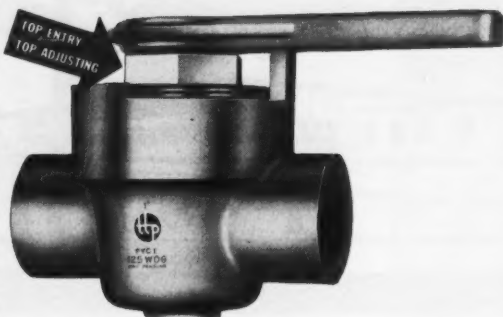
SWARTWOUT DIVISION, CRANE CO.
Hooksett Industrial Park, Manchester, New Hampshire

CRANE

Check 3670 opposite last page.

New ball valve for corrosive service ...easier to operate and maintain

Greatly simplified access for maintenance and easy adjustment without dismantling are made possible by a unique top-entry design of a new ball valve announced by Tube Turns Plastics, Inc. These features, combined with the basic operating advantages of the ball valve, provide important economies for corrosive piping services.



- **Easy to operate** ... simple quarter-turn action with self-indicating port position ... positive, instantly responsive flow control ... self-lubricating "Teflon" seat rings prevent seizing.
- **Easy to maintain** ... top-entry permits removal of one-piece ball and stem for on-the-line maintenance.
- **Easy to adjust** sealing force on seats ... by nut on bonnet, without disconnecting valve.

This new **ttp*** ball valve is available in injection molded UPVC (unplasticized polyvinyl chloride) for up to 150°F, and in "Penton" (chlorinated polyether) for service to 225°F ... in socket, threaded or flanged ends. Write for Bulletin TTP 180. TUBE TURNS PLASTICS, INC., Department CP-8, 2929 Magazine Street, Louisville 11, Kentucky.

*"ttp" is a T.M. Reg. U.S. Pat. Off.

Check 3671 opposite last page.

New...

high
temperature
fuel and
chemical
resistant tape

TEMP-R-TAPE® FR

CHR's pressure-sensitive, TEFLON® tape with
fluoropolymer adhesive.

Temp-R-Tape FR, an exclusive development of CHR, has been specifically made for applications where fuel or chemical corrosion resistance is necessary at temperatures as high as 400°F. In addition to meeting these severe service requirements, Temp-R-Tape FR possesses outstanding electrical properties. It is recommended for splicing, harness wrapping and protective covering on engines of all types, hydraulic equipment, chemical pipelines, and all types of mechanical parts.

AVAILABLE FROM STOCK: ¼" to 2" widths, 36 yd. rolls. Special roll widths slit to order. Sold nationally through distributors.

FREE SAMPLE and folder — write, phone or use inquiry service.

CHR CONNECTICUT HARD RUBBER CO.

• duPont TM

Electrical and Industrial Specialty Tapes
Main office: New Haven 9, Connecticut

Check 3672 opposite last page.

NEW SOLUTIONS



More heat ...

... for furnace serving Esso's giant fluid catalyst cracking unit is being provided by this preheater. Photo shows one of the horizontal preheater's 1000-lb cold-end elements being lowered into position. Operating on a continuous regenerative counterflow principle, unit preheats the furnace's combustion air by recovering heat from exit gases, thereby also cutting fuel costs.

(Ljungstrom air preheaters are product of Air Preheater Corporation, 60 E. 42nd St., New York 17, N. Y.)

Check 3673 opposite last page.

Cut steam line repairs, boost dryer efficiency with amine compound

Pipe nipples now last years
instead of weeks

Problem: Pipe corrosion and steam trap clogging caused maintenance expenses to sky rocket at Whippany Paper Board Company, Clifton, New Jersey. About 18 to 20 corroded pipe nipples were replaced every three weeks.

The trouble was all centered around the 261 dryers serving each of the plants two huge (300 tons per day) paper machines. Extraction steam, at about 45 psi, is used to heat the pulp passing through the dryers.

Solution: A filming amine product was added to the plant's boiler feed water. Material provides thin protective film on metal surfaces contacted by the condensate, effectively controlling corrosion.

Batch of material is made up every eight hours using

condensate between 130 and 170°F. About one 1¼ parts of the product are used per million lb of steam. Plant generates approximately 4.9 million lb steam a day.

Results: Pipe corrosion and steam trap clogging problem has been whipped. Nipples that formerly had to be replaced every three weeks have seen service up to three years — the length of time that the chemical treatment has been in use.

Surface temperature of dryers is up about 20°F. This is due to the fact that the filming amine has cleaned out corrosion deposits. Heat transfer has improved to such an extent that company now saves about 180 lb of coal per each ton of paper board produced. Overall steam line maintenance has been cut by more than 60%, says Whippany.

Water consultant engineers servicing the plant installed metal test strips at several locations to determine effectiveness of the treatment. A strip at outlet of turbo-generator showed weight loss of only 0.0155 grams and a corrosion rate of 0.0007 ipy (inches penetrating per year). Another strip at steam trap discharge from one of the dryers showed weight loss of 0.0550 grams and corrosion rate of only 0.0025 ipy during the same five month test period.

(Hagafilm is product of Hagan Chemicals & Controls, Inc., Box 1346, Rt 60 at Campbell Run Rd., Pittsburgh 30, Pa.)

Check 3674 opposite last page.



"You'll find paging through
our latest catalog very
rewarding—"

THAT'S
INTERESTING

In sweat over sweat

Dr. Irvin H. Blank, associate professor of dermatology, Harvard Medical School, might be said to have been sweating over the problem of how antiperspirants work for six years. They are believed to work by either surface action or penetrating action, but all evidence is inconclusive. The study is being financed by The Reheis Company, Inc.

Zinc in fertilizer

Zinc deficiencies, noted particularly in soil of 11 western states, prompt introduction of fertilizer which combines zinc and nitrogen in easy-to-use solution form.

Collier Carbon and Chemical Corporation, Los Angeles, is marketing it under name Brea brand Aqua-Z.

For more information on product at right, specify 3675 see information request blank opposite last page.

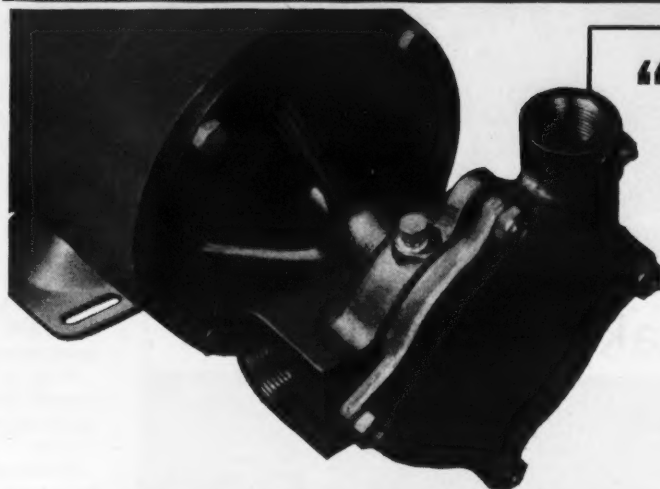


ECO

ENGINEERING

NEWS

the big name in small pumps for the process industries



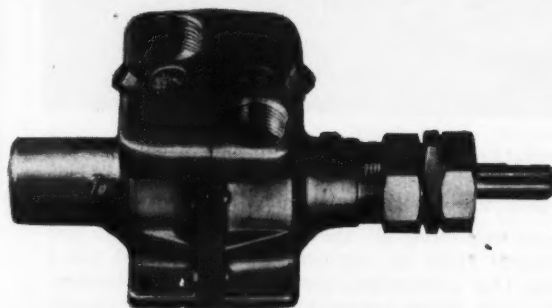
ECO CENTRI-CHEM® PUMPS

Widely applicable, corrosion-resistant centrifugal pumps handling most chemicals including slurries with particle size up to $\frac{1}{16}$ ", as well as troublesome sticky fluids.

Offered in 2 types—close coupled motor mounting, illustrated, and ball bearing pedestal mounting.

Carpenter 20 stainless steel throughout. Impellers fully enclosed or semi-open. Rotary mechanical seal is simply constructed and easily maintained with interchangeable components to meet various exposures.

Capacities to 40 gpm. Heads to 57 feet.



ECO ALL-CHEM® PUMPS

Self-priming rotary, positive displacement pumps with twin opposed oscillating impellers providing linear, non-segmented, non-foaming flows ideal for shear sensitive emulsions and safe for auto-detonating fluids. Designed for severe corrosive service.

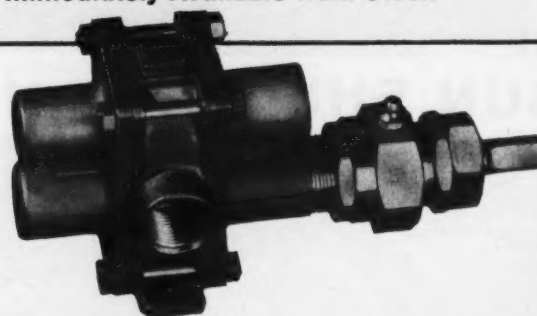
Housings are 304, 316 and Carpenter 20 stainless steel, Hastelloy® B and C. Bearings and seals are self-lubricating, chemically impervious Teflon†. Impellers of Teflon, phenolic resins, Hypalon†, Nylon, etc.

Capacities to 10 gpm, pressures to 75 psi, viscosities to 900 SSU. Drives are direct electric motor, air motor, pulley, sprocket or variable speed drive.

*Union Carbide Trademark, † du Pont trademarks.

"SUPERMARKET" for Small Chemical Pumps

Immediately Available from Stock



ECO GEARCHEM® PUMPS

Self-priming gear pump for intermittent or sustained operation with constant flow metering and reproducible accuracy within \pm one per cent (depending on viscosities) or maintenance of vacuum in the micron range. Handles all chemicals, acids, oxidants, alkalies, aromatics, solvents.

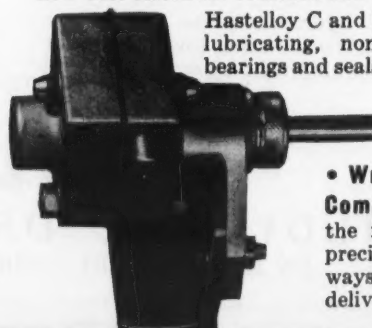
Housing of 316 and Carpenter 20 stainless steel, Hastelloy B and C, monel, nickel, zirconium and titanium. Bearings of du Pont Teflon or carbon. Gears of Teflon, synthetic rubber, phenolic and polyamide resins (Nylon), Hastelloy B and C. Capacities to 10 gpm, pressures to 100 psi at 1750 rpm with light bodied media. Viscosities to 30,000 SSU with metallic gears and reduced speeds and volumes. Same drives as with ALL-CHEM Pumps.

ECO MINILAB® PUMPS

The ideal all-purpose laboratory and pilot plant units which handle severe corrosives around the clock.

Capacities from 0 to 2 gpm, pressures to 100 psi. Reversible and self-priming.

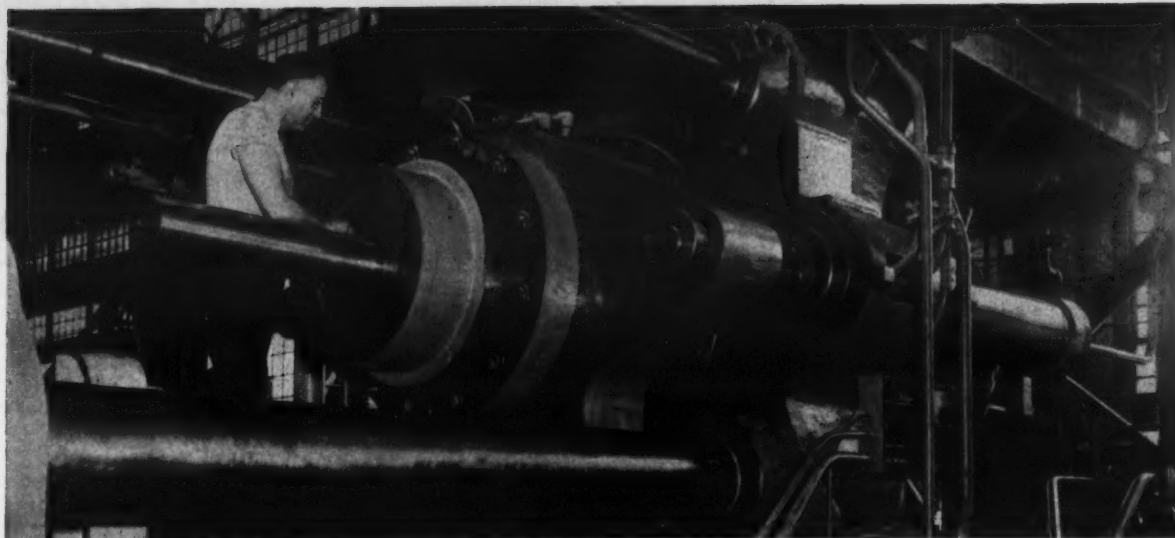
A rotary, positive displacement pump which yields linear flow best suited for constant flow metering.



Hastelloy C and Teflon construction. Self-lubricating, non-contaminating, Teflon bearings and seals.

• Write for Literature on Complete Eco Pump Line, the mass-produced standard precision pumps which are always available for immediate delivery from stock.

ECO ENGINEERING COMPANY • 12 New York Avenue • NEWARK 1, N.J.



SUN SHIP has what it takes to build



for INDUSTRY

We're old hands at building complete machines and special equipment for use in a wide range of industries. For 44 years our large and amply equipped shops have produced items ranging from small tanks to huge fractionating towers, pressure vessels, stills, plate work and special-purpose machinery for the chemical, petroleum and other industries.

Pictured here are a hydraulic press, which was shipped by rail, and a fractionating tower ready for loading on a barge for shipment by water to an oil

refinery. They are just two examples of the equipment Sun Ship contributes to many fields, also examples of our shipping facilities.

Because we have all the facilities, we build all equipment right in our own plant, without subletting. Our convenient location on the Delaware River, with direct access by rail and water to all points, assures speedy delivery.

Let Sun Ship solve your machine or equipment problem. Phone or write our Sales Engineering Department.

Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

Check 3676 opposite last page.

NEW SOLUTIONS

**Lacquer, oil never mix
when compressor supplies
oil-free air pressure**

Unit aids color spotting
Sherwin-Williams

Problem: Lacquer and oil better not mix at Sherwin-Williams Company's North Olmsted, Ohio, printing plant. In recent advances in printing color chip charts for paint sample brochures, sample colors are printed on a single sheet rather than utilizing pasted-on chips. In color-spotting machine, up to 120 separate colors are spotted on a single sheet. Each color is delivered to the sheet by compressed-air.

Any water or oil in compressed-air supply could seriously effect final color reproduction.

Solution: Compressed-air for entire plant was supplied by an oil-free compressor. Unit employs "T-Block" design which utilizes carbon-graphite compression rings that eliminate need for lubrication in cylinders. These four-piece rings maintain a



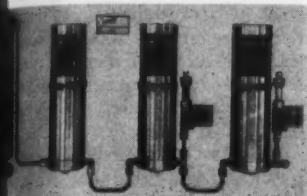
Oil-free air helps keep operation of color-spotting machine efficient and dependable

high degree of volumetric efficiency throughout entire life of each ring section. Blow-by is virtually eliminated. Wide carbon-graphite support ring, positioned between two compression rings, prevents any part of piston from rubbing cylinder liner.

Durable-corrosion-resistant stainless steel coil springs provide independent tension on each ring section for even wear. A piston, brass T-Block

To page 50

When water or oil
in gases cannot
be tolerated...



INSTALL ROBBINS

dehydration equipment

Robbins Aviation offers you both dis-
able cartridge type and refrigeration
dehydration systems for practically
types of gases... equipment designed
built to rigid quality control stand-
to give you maximum satisfaction in
trouble-free performance.
Robbins equipment is used extensively
aircraft pneumatic systems, test labo-
ratory equipment, mobile compressor
rulers, hydraulic system purging, mis-
charging and pressurizing systems,
instrument, laboratory, and factory
controlled atmospheres for brazing
and heat-treating furnaces, etc. Mechan-
ical filters, drier and purifier chambers,
fillable and disposable cartridges, dew-
point indicators also available.

**Fast, positive, economical
removal of water or oil
vapor and impurities**

Pressure to 12,000 PSI
Safety Factor 4 to 1
Operating Temp. -100°F
Vapor
Removed to as low as 0.3 ppm/w

Write today
for
complete
information!

ROBBINS
Aviation Inc.

Manufacturers of high quality valves
and dehydration equipment
60 E. 38th St., Los Angeles 58, Calif.
LUDlow 9-5221

Check 3677 opposite last page.

AUGUST 1960



processing and engineering data

287

Characteristics for Formed Pressure-vessel Heads

R. D. BIGGS

Midland, Mich.

This nomograph gives a convenient method of estimating characteristics for three commonly used types of formed heads for pressure vessels, according to manufacturer's formulas:

Standard flanged, dished head:

$$IDD = \frac{OD}{7}, A = 0.87 (OD)^2, V = 0.43 (OD)^3$$

ASME flanged, dished head:

$$IDD = \frac{OD}{6}, A = 0.92 (OD)^2, V = 0.59 (OD)^3$$

Ellipsoidal head:

$$IDD = \frac{ID}{4}, A = 1.19 (ID)^2, V = (ID)^3$$

where: IDD = inside depth of dish, ft
OD = outside diam, ft
ID = inside diam, ft
A = surface area, sq ft
V = volume, cu ft

These formulas do not include straight flange. This can be calculated as part of cylindrical shell. In absence of tables of head characteristics, engineer can estimate properties to within approximately 5% with this nomograph.

Typical Example

To find head characteristics of a 2' ID ellipsoidal head, connect inside diam with each of gage points for ellipsoidal heads (labeled A, V and IDD) in turn and extend to respective scales to find area, volume and inside depth of dish.

nomograph on page 51

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Chemical Processing—August 1960

How our small plant solved its waste disposal problem WITHOUT CAPITAL OUTLAY....



Pat. No. 2,900,096

DEMPSTER-DUMPMaster Equipped Hauler Provides Containers and Service for Small Fee

Our small Midwestern manufacturing firm did not generate enough refuse to justify ownership of its own refuse disposal system. Yet, it was plagued by unsightly trash piles, fire hazards and scattered refuse in the plant yard.

Our plant engineer then heard of a **DEMPSTER-DUMPMaster** equipped private hauler in the adjoining city. A survey revealed that two big-capacity refuse containers, placed one at each end of the plant, would handle the entire refuse accumulation.

The private hauler placed the containers, and a small monthly fee covered maintenance, labor, hauling and dumping refuse. No capital outlay was involved, disposal costs were reduced, and plant house-keeping was vastly improved.

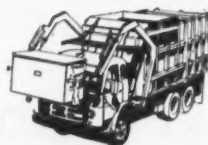
In all major cities, private haulers who own **DEMPSTER-DUMPMaster** equipment render fast, efficient, low-cost refuse storage and collection service. They place one or 100 containers at your service for a reasonable fee. A free brochure describes their service in detail.

Free Brochure and Name of Nearest Private Hauler on Request
**Dept. CP-8DEMPSTER BROTHERS Knoxville 17, Tenn.
Inc.**

DEMPSTER-DUMPMaster



DEMPSTER-DUMPMaster



**DEMPSTER COMPACTION
TRAILER**



**IN ALL LEADING CITIES
FROM COAST TO COAST**



**DEMPSTER
DUMPMaster**
EQUIPPED
PRIVATE HAULERS

NEW SOLUTIONS

From page 48

expanders and Teflon sleeves add further protection against corrosion. Compressor is vertically designed, providing for longer wear and less maintenance. Equal pressure on all sides of ring produces even wear, consequently, cylinder needs never be rotated. Because of vertical design, unit requires a simple, inexpensive, block-type foundation on a small floor area.

Results: By delivering water- and oil-free air, compressor helps assure trouble-free operation of color-spotting machine. Air is supplied at 15 to 30 psi.

In addition to air used in color-spotting machine, air is also used to deliver dry powder offset spray to offset printing press. Here, any moisture or oil in the line would cause caking of powder. Failure of powder spray would permit freshly inked sheets to stick. This does not happen.

Air is also used for clean up, handling and feeding of paper to presses.

No maintenance is required on compressor during normal operation. Unit runs 24 hours a day, six a week.

(WG-9 oil-free compressor is product of Joy Manufacturing Company, Henry W. Oliver Building, Pittsburgh 22, Pa.)

Check 3679 opposite last page.

WANTED: NOMOGRAPHS — WORTH \$20 EACH!

Do you have a pet nomograph that could save time for other **CHEMICAL PROCESSING** readers? If so, send it neatly and accurately drawn, with a double spaced, typewritten description to:

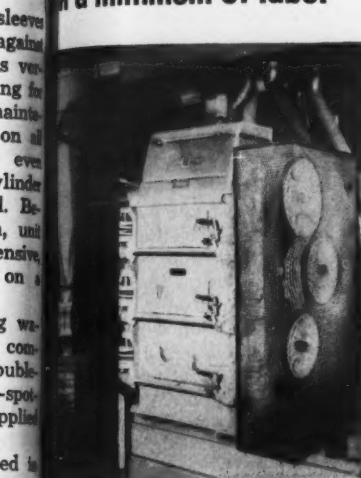
**Data Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois**

We will pay \$20 for each one accepted and published.

Check 3678 opposite last page.

Mem:

process garlic chips
in a minimum of labor



ution:

SPROUT-WALDRON
ROLLER MILL, SIFTER,
NEU-VAC®

When a group of California business men decided to manufacture a line of dehydrated garlic and onion products with quality as their byword, they put their faith in a Sprout-Waldron processing system. The surge hopper over the roller mill is filled by a bucket elevator. The garlic chips are reduced in the mill, they are picked up by a Neu-Vac negative pressure system and discharged into a Gyro-Whip sifter. The skins are scalped off and oversized material is recirculated through the mill.

The use of pneumatics keeps the operating area clean and pleasant. The system automatically produces the ground product at rates of 500 lbs. per hour.

For further information on the Sprout-Waldron stainless steel Gyro-Whip sifter, ask for Bulletin 153-B. Data on the three-pair high roller mill will be found in Bulletin 153-B. Complete details on Sprout-Waldron pneumatic systems are found in Bulletin 18-F.

CW/110

SPROUT-WALDRON
Muncy, Pennsylvania

Reduction • Size Classification • Mixing
Bulk Materials Handling • Pelletizing

Check 3680 opposite last page.

AUGUST 1960

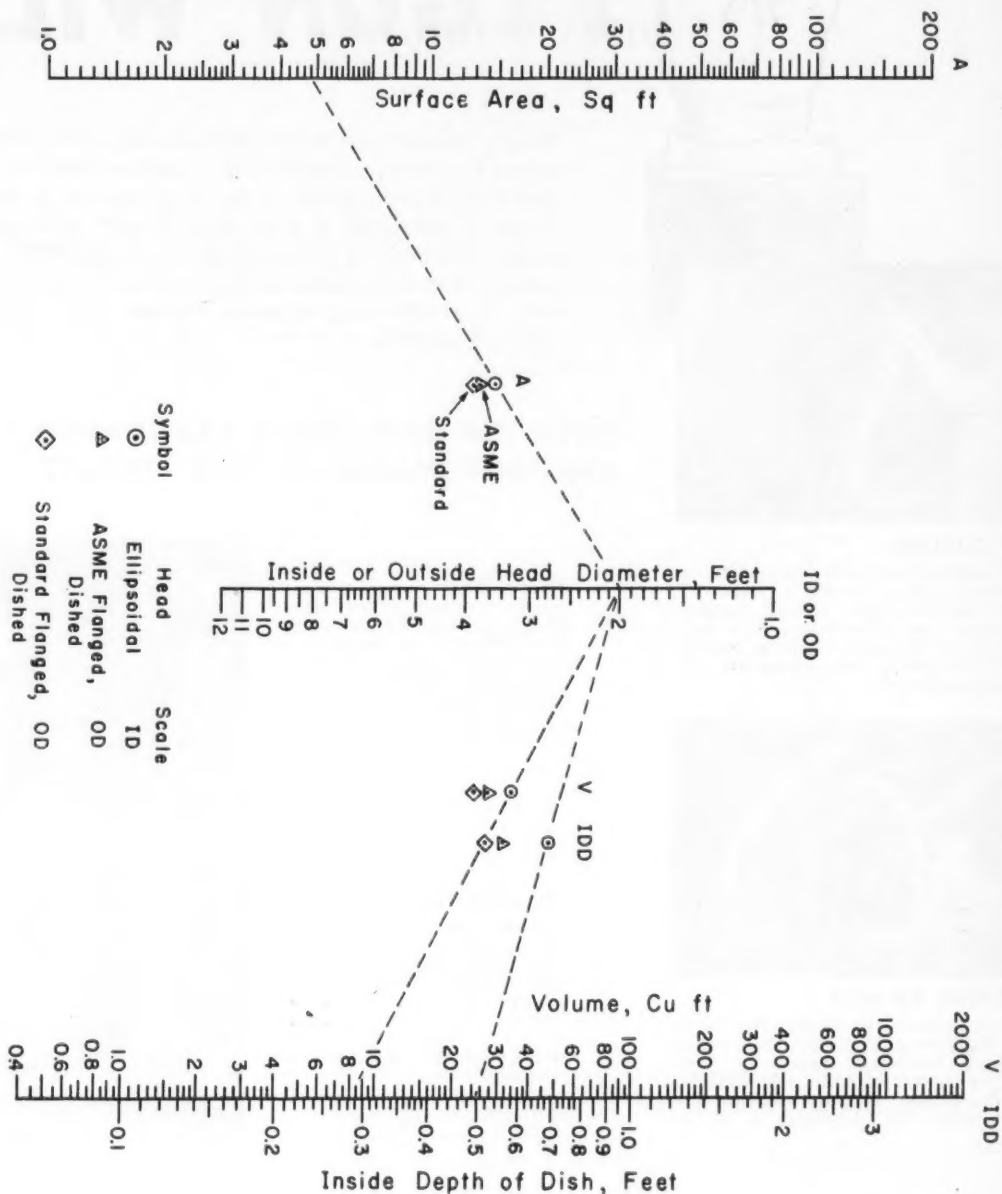


processing and engineering data

287

Characteristics for Formed Pressure-vessel Heads

From page 49



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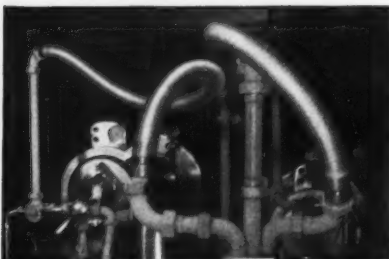
Chemical Processing—August 1960

This won't stop corrosion— but versatile-flexible **TYGON® WILL!**



AS A COATING

Easily applied by brush, spray, dip or roller-coat, Tygon forms a fast-cure, tough, impermeable plastic barrier that seals out corrosive fumes and acids. Gives equipment longer lasting protection against chemical attack and extreme moisture.



AS TUBING OR HOSE

Flexible, glass-clear Tygon Tubing is ideal for piping flavor-sensitive liquid foods or corrosive chemicals. Non-toxic, non-contaminating, sterilizable. Tough, durable, abrasion-resistant for long service life. Available 1/16" to 4" I.D.

Simply crossing the fingers doesn't help much when it comes to corrosion control. But a sure-fire method—and much more economical in the long run—is to specify Tygon if corrosion is a problem in any product you make. Available in a variety of convenient forms and job-specified formulations, Tygon offers superior resistance to a wide range of acids, alkalies, salts, alcohols, oils and solvents.

CHECK THE WAYS TYGON CAN IMPROVE VALUE AND PERFORMANCE OF YOUR PRODUCT

AS LININGS

Tygon Sheet offers heavy-duty protection against corrosive solutions in storage and processing tanks of all shapes and sizes. Easier to install, handles many of the tough jobs rubber and other linings cannot do.



AS GASKETING

Tough, resilient Tygon Gasketing assures tight, durable, leak-proof sealing. Its excellent chemical resistance eliminates costly corrosion "trouble spots" where other materials fail. Cut from sheet, tubing, solid cord, or molded to your specifications.



Write for detailed Tygon Portfolio today—or ask our engineering staff to recommend the proper Tygon formulation for your application.

PLASTICS AND SYNTHETICS DIVISION



U. S. STONEWARE

AKRON 9, OHIO

145-F

Check 3681 opposite last page.

NEW SOLUTIONS

Tank trailers look better, have longer service life with urethane coatings

Problem: Chemical tank trailers had to be repainted every three months at Chemical Tank Lines, Buffalo, New York. Used to haul acids, solvents and other chemicals, the vehicles were subjected to inevitable drips and spills at loading and unloading areas, as well as corrosive fumes and vapors. In addition, equipment must withstand routine highway wear in all types of weather throughout a 38-state area from New England to Texas.

Solution: Urethane coatings were applied to the undercarriage and the exterior tank body of a new trailer. Vehicle was placed into service January 1958.

Results: Numerous inspections conducted since then have shown that the coating can withstand the tough service. All letterings and markings are still bright and clear.

Based on this experience, the company specified urethane coatings — factory applied or custom-coated locally — for all new additions to its acid tanker fleet.

Urethane was also specified for underbodies of stainless steel and aluminum trailers used in other service. Older equipment too has been painted with the urethane finish. Longer tank life, less maintenance downtime and improved customer relations because of the good appearance of the equipment has paid off many times.

(Organic isocyanates used as raw material for producing urethane coatings are product of Elastomer Chemicals Department, E. I. du Pont de Nemours & Company, Wilmington 98, Delaware.)

Check 3682 opposite last page.

Pierced-metal and split-screen applications are described in 12-page bulletin. Typical screen assemblies and shapes, perforation and split configurations and other data are cited. Bul C101—Cross Perforated Metals Plant, National Standard Company.

Check 3683 opposite last page.



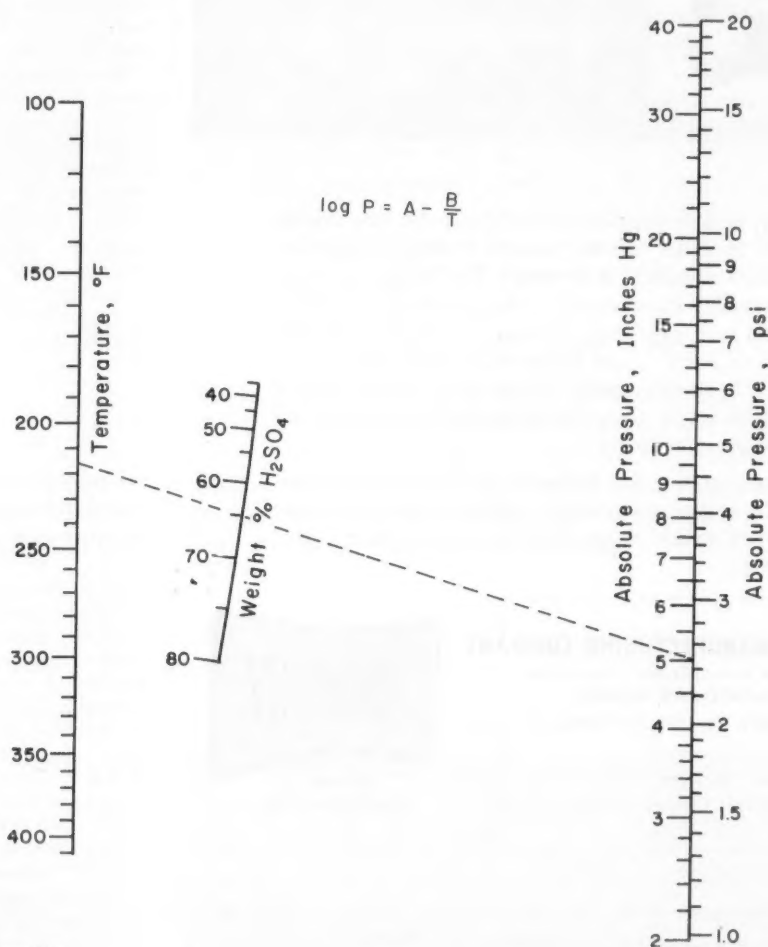
Boiling Temperatures of Sulfuric Acid

R. F. BATTEY
Garden Grove, Calif.

This line-coordinate chart is based on the integrated Clausius-Clapeyron equation relating vapor pressure and temperature:
where: P = vapor pressure, mm Hg
 T = absolute temperature, °K
 A and B are functions of H_2SO_4 concentration.

Typical Example

Find boiling temperature of a 65% H_2SO_4 solution at five inches Hg absolute pressure. Connecting five inches Hg absolute pressure. Connecting five inches on right-hand scale and 65% on middle scale, read 216°F on left-hand scale.



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Chemical Processing—August 1960

HIGH PRESSURE GAUGES

USED IN
REFINERIES
AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD



REFLEX
Single or Multiple
Sections

TUBULAR
Gauge Cocks
Large Chamber
Reflex Gauges
Heated or Cooled
Gauges

SEND FOR
COMPLETE
CATALOGUE

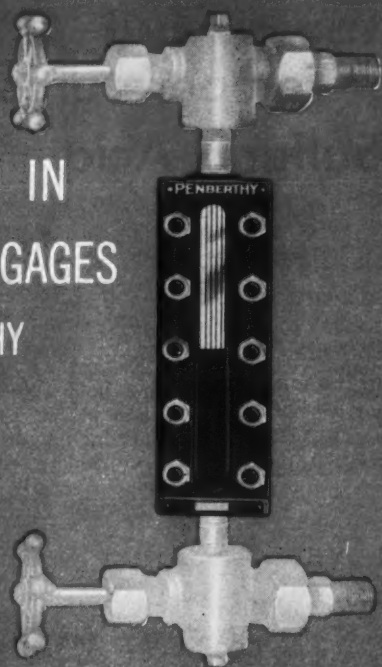
STRAHMAN VALVES, Inc.
NICOLET AVE., FLORHAM PARK, N. J.

Check 3684 opposite last page.

AUGUST 1960

ACCURACY

UNMATCHED IN
LIQUID LEVEL GAGES
BY PENBERTHY



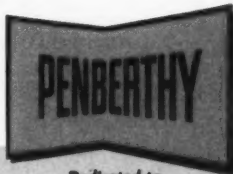
Certainly, your *first* requirement of a gage for determining liquid levels in tanks, pressure vessels, boilers, evaporators and other fluid containers is *Accuracy*. The design, materials and craftsmanship incorporated in the construction of Penberthy liquid level gage sets *guarantee* you clearer visibility, unmatched accuracy . . . at temperatures from sub-zero to 750°F. And Penberthy stands behind that statement with a 74-year reputation for unquestioned leadership in gage development and manufacturing.

You may be sure, too, that Penberthy gages are built to simplify service, reduce maintenance, minimize blowout hazard and, above all, to last longer. Want more information? Mail coupon today.

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Check 3685 opposite last page.

NEW SOLUTIONS

Control rod mechanisms simplified, made smaller on A-reactors

Space needs cut by woven wire, "pancake" drum

Cables and drums with their complicated and bulky traversing mechanisms are being done away with as nuclear reactor control rod gear. Valuable space is being saved by means of a "pancake" winding drum used in conjunction with a ribbon of woven wire of nearly the same width — preferably a length of flattened tubular woven stainless steel wire braid.

Lateral movement of cable is kept to a minimum. Flattened wire braid is very resistant to edge-tearing and capable of supporting heavy loads with good safety factor. Control rods can be raised or lowered into core of reactor smoothly and efficiently.

Disadvantage of the flattened wire braid is that it tends to stretch under load. However, this is easily compensated for since amount of stretching for a given load is about constant.

(Further information about reactor control rod gear is available from Patents Exploitation Officer, U. K. Atomic Energy Authority, 11, Charles II St., London, S.W.1.)

No leaks in five years reported for acid pumps in appliance plant

A major appliance manufacturer reports that an acid transfer system using efficiently designed positive displacement pumps has reduced annual pump maintenance by as much as 30%. Other benefits include: Pumps minimize leakage loss of expensive acids, assure maintaining of more even proportions in finishing vats, and provide safer overall chemical feed system.

Pumps used in the plant have operated without leakage for over five years. In operation, piston reciprocating in cylinder causes displacement



AIRETOOL makes tube maintenance a ONE-MAN job

Compact and lightweight for one man operation, Airetool job-fitted pneumatic tools and accessories cut tube fabrication and maintenance costs and boost production.

CC-475 CONDENSER CLEANER

Powerful Airetool unit for fast, efficient removal of tough tube deposits. Built-in flushing system cools cutting head and washes out debris and scale.



AIRETOOL

Positive, automatic tube expansion control. Accuracy to within .001 inch. Quickly and easily pre-set. One man rolls up to 720 tubes an hour.



INTERNAL TUBE CUTTERS

Air-powered, compact and lightweight for use with precision cutting tools. Positive feed control governs rate of cut, eliminates gouging, etc.

Airetool also makes brush head cleaners, cleaning heads and motors for straight and curved tubes, as well as a full line of air operated production tools and grinders. For complete details or in-plant demonstration, write:

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European Plant: Vlaardingen, The Netherlands
Canadian Plant: Brantford, Ontario



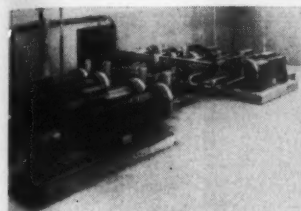
Check 3686 opposite last page.

CHEMICAL PROCESSING

NEW SOLUTIONS

proportional to travel of piston. A "micro" stroke adjustment with calibrated control for indicating length of piston stroke can be set while pumps are in operation.

Piston forces oil to move diaphragm forward and re-



Diaphragm-type positive displacement pumps are used to inject exact quantities of concentrated sulfuric, nitric and phosphoric acids into conditioning vats at major appliance plant

turn. Back stroke takes liquid into reagent head through suction check valves. Product is forced through discharge valve on forward stroke.

Because diaphragm isolates liquid being pumped within reagent head plate and check valves, no other parts need be of chemically-stable material. Diaphragm is hydraulically actuated and loading is uniform. Pumps require no stuffing box, fluid or liquid seal or flush stream.

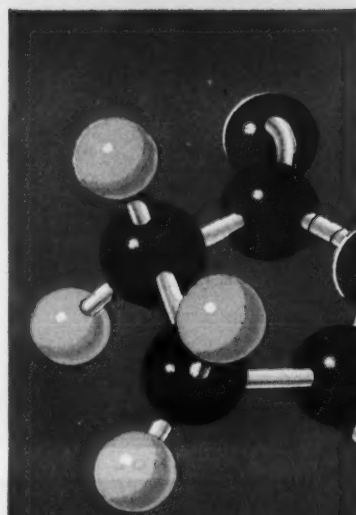
Since July 1955, when pumps were first installed, annual maintenance costs have been less than 5% of initial purchase price.

(Further information on Pulsafeeder pumps may be obtained from Process Equipment Division, Lapp Insulator Company, 114 Hall Street, LeRoy, New York.)

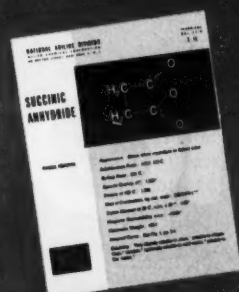
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NEXT MONTH

Ore moving operations — regardless of magnitude — need not cause a dust nuisance. Kaiser Aluminum has proved this by equipping giant dockside, bauxite unloading towers with dust collectors that trap 98% of airborne particles. The huge Louisiana installation is described in the September issue of *CHEMICAL PROCESSING*.



"SMALL" MOLECULE
BIG VALUE



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SUCCINIC ANHYDRIDE

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Sole domestic custom seller of SUCCINIC ANHYDRIDE, National has long experience, integrated production, efficient processes. From present production, we can supply pilot-plant quantities to new users. Additional commercial capacity should be on stream as fast as needed. Ever-increasing capacity at cumulatively decreasing costs will be provided to meet market needs.

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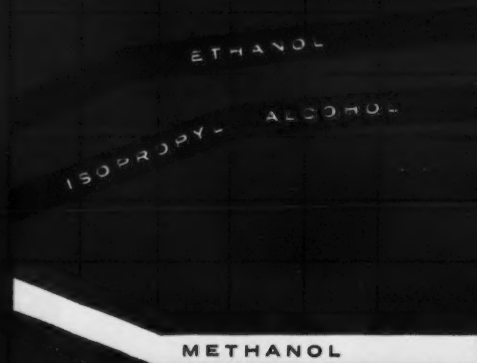
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of your alcohol needs
can be filled by



Low cost methanol

It's only common sense to look at *all* raw material costs—alcohol costs, for example. Here is where lower price methanol may be able to deliver real savings over the alcohol you're now using. How much can methanol help to reduce manufacturing and processing costs? Plenty, when you consider that the total market for the big 3 alcohols is in excess of 4 billion lbs. annually. Methanol, the lowest cost of the three, often can offer definite advantages when used in place of isopropanol in automotive chemicals, laminates, pharmaceutical extractions, metal cleaning and petroleum processing . . . and in place of ethanol in petroleum processing, as a dye solvent, and in film manufacture. What's your share of these potential savings? Write for Product Bulletin S-03-6, or check with your Celanese representative or distributor. They can give you money-saving facts about Celanese Methanol, and answer your specific questions. Celanese Chemical Company, a Division of Celanese Corporation of America, Dept. 591-H, 180 Madison Avenue, New York 16. Celanese®
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For more information on product at left, specify 3689 request blank see information opposite last page.





Now in large-scale availability . . .

Polyethylene oxide vies for position among the water-soluble synthetics

By JOHN MELLECKER, Editor
Industry Planning & Research

Polyox, polyethylene oxide, one of Union Carbide Chemical's answers to the three-billion-lb/yr (and growing) water-soluble resins and gums market, has reached large-scale availability. Introduced three years ago in developmental quantities, new plant facilities make carload units readily available. Over months of intensive market development, Polyox has shown itself to be a worthy performer for dissolvable packaging films, non-polluting textile sizing, paper-coating extending, and a host of other applications (see "some reasons.")

The only water-soluble synthetic thermoplastic, Polyox for this reason is undergoing market development and finding acceptance in areas where lower-cost materials currently abound. "This resin," states Polyox marketing supervisor Les Berger, "must compete with such solidly established materials as natural and modified starch, and such attractive new materials as PVA, CMC, and our own hydroxyethylcellulose."

"Polyox will succeed in a large-scale use pattern," predicts Berger, "as enough potential users become aware of the specific differences between it and other available materials." The field will ultimately settle down, believes Berger, to one akin to lacquer solvents or polyurethane foams. In each of these cases, a wide variety

of different formulations has become available to meet specific industry needs. Carbide's field marketing setup is geared for working out with each individual textile mill, paper mill, wrapping plant, and minerals processing mill a formulation incorporating Polyox for maximum performance and economy.

Steady Supply Assured

One factor about Polyox should be given particular attention by would-be users . . . the potential for uninterrupted availability at ultimately lower costs. Of petrochemical source, Polyox represents a relatively simple configuration of epoxy units (ethylene oxide molecules) coupled in numbers as large as 100,000. At one time a curiosity in the form of white ivory-like substance which forms around the outlets of ethylene oxide cylinders, the polymer was identified as having formed as a result of the catalytic effect of iron oxide present on the metal surface.

Today Polyox is probably made through use of finely divided alkaline earth metal oxide catalysts (1). In this

process, calcium, strontium, or barium oxide in concentrations ranging from 0.05 to 1.5 weight percent at about 90°C bring about efficient polymerization to desired 15,000 to 20,000 molecular weight range. Another process (2) uses chelates of calcium, strontium, or barium, with a temperature range of 90 to 150°C. Both of these processes are patented and assigned to Union Carbide Chemicals. Because of the attractive potential for polymers based on the profusely available raw material ethylene oxide, others are said to be working on processes. To date, Carbide is the only producer.

Present price is in the 83-85¢ range. Ultimately, Carbide expects the price to be reduced to 35-40¢. In the meantime, every effort is being directed to develop Polyox' market on a quality-for-quality basis.

Skirts Stream Pollution

The material can make a major contribution to changes in textile mill operations. Currently, stream pollution and high humidity working conditions are problems the textile industry is coping with in various ways. Because of its lack of biological activity, Polyox-containing wash waters can be directly discharged into streams without changing their BOD. This may in some cases eliminate the need for

Some Reasons WHY Polyox has caught hold

Textile size — In addition to usual prerequisites for warp sizes, Polyox has almost no Biological Oxygen Demand . . . wash water can be discharged into streams without polluting . . . high humidity in weaving rooms not needed, ambient or air-conditioning satisfactory . . . Sizing solutions don't deteriorate even on long storage . . . additives and auxiliaries (waxes, softeners) not needed . . . only 1/3rd as much Polyox for same effect as starch . . . cotton-synthetic mixtures no problem.

Paper-coating extender — Weight reduction of pigment use results from improved filtration qualities imparted clays . . . titanium-dioxide-clay suspension coagulated with as little as 0.5% Polyox to increase filtration rates 60X.

Soluble wrapping films — Polyox only heat-sealing (thermoplastic) soluble packaging film . . . bends at 70-100°C . . . film formed by thermoplastic techniques (extrusion, calendaring) . . . oriented films have tensile strengths of 10,000-15,000 psi . . . film easily applied to paper for grease resistance.

Water-insoluble coatings — Polyox 1:1 with polyacrylic acid and trace NH_3 (pH above 3.5-4.0) remains water soluble but precipitates (into film) when NH_3 flash evaporated . . . resulting film substantially water insoluble, with increased resistance to oils, greases . . . coating dissolvable only in strong alkalis . . . optional process uses relatively high percentages ethanol, methanol or acetone, evaporation of which insolubilizes resin mixture . . . action termed "association complex."

Pre-filtration or sedimentation flocculating agent — As little as one-ppm Polyox flocculates filterable inorganic suspensions and sedimentation slimes . . . 0.01% Polyox has increased filtration rate leached ores by 300X . . . phosphate slime sedimentation rate increased 6X by 0.005% . . . dispersed organic elastomers (synthetic rubber) are readily coagulated.

Other applications — Binder, foam stabilizer, lubricant for detergent bars, shampoos, toothpastes . . . film-former for hair sprays, face and hand creams, shaving preparations, shampoos . . . lubricant for toothpaste . . . viscosity controller for antiperspirant creams . . . solvent evaporation retarder for paint removers . . . thickener and stabilizer for gloss latex paints.

Toxicity — Feeding studies show no deleterious effects at 12 months . . . no primary cutaneous irritant, fatiguing, or allergenic actions noted with 3% aqueous solution.

Literature cited:

- (1) Bailey, F. E., Jr. (to Union Carbide Corporation), U.S. Patent 914,491 (Nov. 24, 1959).
- (2) Hill, F. N., and Fitzpatrick, J. T. (to Union Carbide Corporation), U.S. Patent 2,866,761 (Dec. 30, 1959).

UNIQUE STARCH PROPERTIES

FROM GENETICS AND DERIVATIZATION



☐ **KOFILMS**—a series of low substituted corn starch acetates covering a wide range in viscosity. Designed for excellent film forming with maximum stability. USES: Sizes, binders.



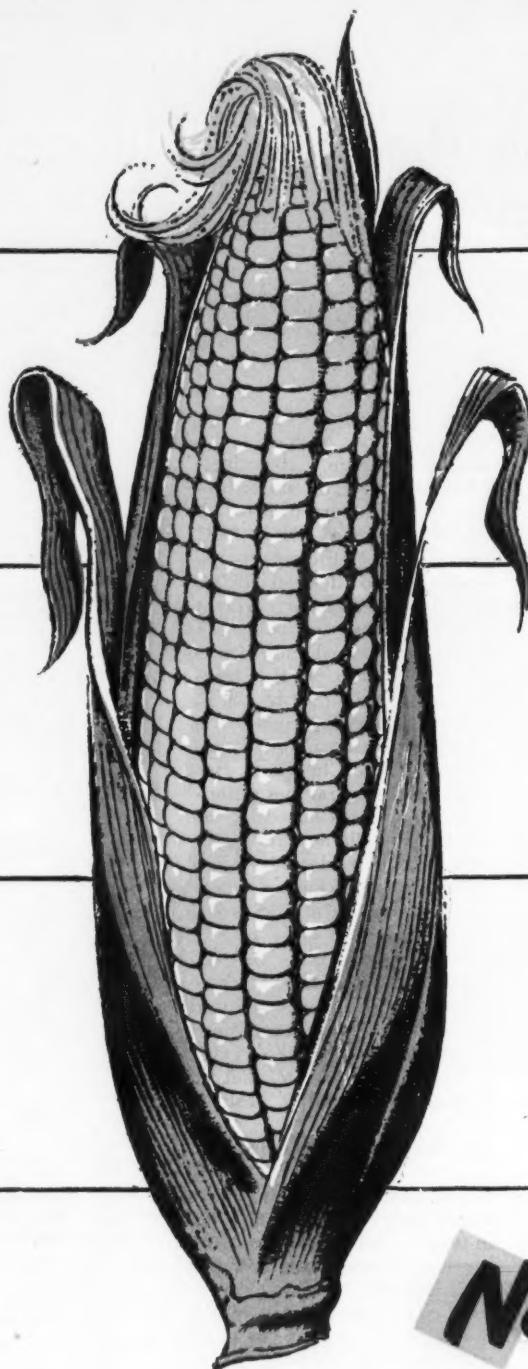
☐ **AMYLON**—first high amylose corn starch ever produced in semi-commercial quantities. Contains 57% amylose (ordinary corn starch has only 28%). Potentially offers stronger gels and tougher, more flexible films than possible with conventional starches.



☐ **NU-FILMS**—a series of hydrophilic starch derivatives which are polyelectrolytes. Dispersions offer excellent stability. A range of viscosities is available. USES: Sizing, thickener, finger paints, lotions, leather pasting.



☐ **KOSOL**—a cold water swelling amylopectin starch with excellent solution stability and surface filming. Clarity, stability and resistance to low temperatures are unusual. USES: Thickeners and stabilizers for foods, textile finishes, adhesives, sizes, paints, laundries.



☐ **ANOX STARCH**—a newly developed starch derivative that exhibits unusual clarity and filming properties. It offers excellent stability as well as low viscosity. USES: Sizes, adhesives.



☐ **DRY-FLO**—a hydrophobic starch powder that flows like a liquid. It is water repellent, yet absorbs water vapor without losing mobility. USES: Dusting powder, fluidifying agent, lubricating agent, detackifier, emulsifier, water repellent film.



☐ **CATIONIC STARCHES**—starches that carry a cationic charge as an integral part of their polymeric structure. Unusual properties include a strong affinity for negatively charged surfaces. USES: Size, binder, flocculant, stabilizer, thickener.



☒ **CHECK THE STARCHES** you'd like to know more about for use in:

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Check 3690 opposite last page.

CHEMICAL MATERIALS

constructing waste-disposal plants alongside textile mills. As regards humidity—needed for plasticizing starch—Polyox works excellently with ambient or even air-conditioned circumstances.

In the magazine field, postage costs (based on weight) are sometimes 50% of the total cost of production of the magazines. Here Polyox or similar product may some day enable high-grade coated printing paper stocks to weigh substantially less, with obvious advantages.

Wrapping papers made with Polyox can make use of a most unusual ambivalent quality of this polymeric material—it can be insolubilized to water! Combined 1:1 with certain other polymers containing numerous carboxylic acid groups, strong association complexes are formed, which are water soluble as long as the pH is kept above 3.5-4.0. Ammonia is a convenient agent for this purpose. When the polymer mixture is coated upon paper, for example, and the ammonia flash-evaporated, a substantially water-insoluble film results! In addition, the film has increased resistance to penetration by greasy substances.

It is perhaps in the field of dissolvable packaging that polyox may reach its biggest foreseeable market. Here, it is the only water-soluble film-forming material that, because of thermoplasticity, is directly heat sealing.

Polyox fits into markets in which development is achieved through meticulous attention to detailed properties. Give Polyox close scrutiny, and chances are you may find it optimum for one of your own needs . . .

(Polyox is a product of Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York, N.Y.)

Check 3691 opposite last page.

Zirconium oxides and high-temperature materials are subject of well-illustrated four-page brochure which lists materials and describes manufacturing processes. "Zirconium Oxides" — Zirconium Corporation of America.

Check 3692 opposite last page.

THAT'S INTERESTING

Taking skid out of rugs

If your scatter rug slips or skids, help is at hand in form of rug-backing compound which do-it-yourself rug owners may apply. Named Elmer's Floor Grip, it is being marketed by The Borden Chemical Company. Compound adheres to rugs, but not floors.

Reactor record

Prototype lightweight reactor, designed to provide auxiliary power for space vehicles has set a record for continuous operation—1000 hr at coolant outlet temp of 1200°F.

About the size of 5-gal can, reactor has produced more than 100,000 kw/hr of heat since November 1959. Atomics International designed and constructed 200-lb reactor for AEC.

For more information on product at right, specify 3693 see information request blank opposite last page.



Which of these 3 products and services can y



TECHNICAL BULLETINS DESCRIBING H_2O_2

We got 'em —
You can have 'em —
They're FREE!

Years of experience in working with Hydrogen Peroxide have produced a wealth of information on this valuable compound, its properties, and reactions. Much of this information is available virtually exclusively from Becco. We've compiled a number of Technical Bulletins, which are yours free on request. Simply decide which ones you want, and mail the coupon below.

- No. 2—Hydrogen Peroxide (general information)
- No. 41—Becco H_2O_2 35% HP (high purity)
- No. 42—Becco H_2O_2 35% Formula D (for preparing dilute solutions)
- No. 46—Concentrated H_2O_2 (over 50% concentration)
- No. 70—Becco Hydrogen Peroxide SP "100" (Super Pure, of virtually 100% concentration.)



Where can you use
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Becco PEROXIDES?

By "other", we mean "Other than Hydrogen Peroxide". Lots of otherwise knowing people labor under the impression that Becco makes only H_2O_2 . Actually, there are quite a few "other" useful peroxides in Becco's catalog, some of which are especially suited to high-temperature oxidation reactions.

Look over the list below. Give you ideas? Remind you of a problem you've got? Either way, a note to Becco will bring you more information. Or, use the handy coupon.

UREA PEROXIDE—for use in hair dyeing and cold waving, disinfectants, hypo eliminators, and as a source of water-free H_2O_2 .

SODIUM CARBONATE PEROXIDE—for compounding detergents and adhesives.

SODIUM PERBORATE—for use in dyestuff development, detergents, tooth-powders; as a mild bleaching agent and cold wave neutralizer.

CALCIUM PEROXIDE—for dough conditioning and in high-temperature oxidation reactions.

MAGNESIUM PEROXIDE—an anti-fermentative, for compounding antacids and laxatives.

ZINC PEROXIDE—for use as a disinfectant and deodorant in dusting powders, ointments, etc.



Over 100,000,000 pounds
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epoxidation processes,
using Becco H_2O_2 !

Practically everyone who manufactures plasticizers is using a Becco epoxidation technique or a slightly modified version.

Since 1950 Becco has been foremost in research and development of the epoxidation of unsaturated fatty acid esters.

Take advantage of these years of experience. Write immediately, outlining your particular interest, or request a free copy of Becco Bulletin No. 69—"Epoxidation and Hydroxylation with Becco Hydrogen Peroxide and Peracetic Acid". Use the handy coupon below.

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household
product!

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They are available in a wide variety of odor types, each of which is extremely versatile—can be quickly and easily adapted to the specific needs of the product in which it is to be used.

You can select and apply the right ODRENE for your product with minimum trouble and expense. And you can be sure that its fragrance is one for which the public has expressed a preference!

ODRENES are products of Sindar's pioneering experience in aromatics. Ask us for samples and technical cooperation.

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BULK LIQUID



CARBONIC GAS



DRY ICE

CHEMICAL MATERIALS

Water dispersion of brings film-form advantages

Long Search Nears End

Film form of polyvinylidene chloride is outstanding, if not unequaled, among plastic packaging materials in use today. Toughness, flexibility, and clarity are familiar in a widely used household wrap.

For several years, industry has been trying to find a method of economically combining polyvinylidene chloride resin films with cheaper, more rigid material such as paper and paperboard, corrugated liner board, aluminum foil and even other plastic films. Until now, however, this more extensive use of the resin has been impeded largely by a comparatively high cost and non-adherent qualities. The latter makes it extremely difficult, and usually prohibitively expensive, to use the film form as a laminate.

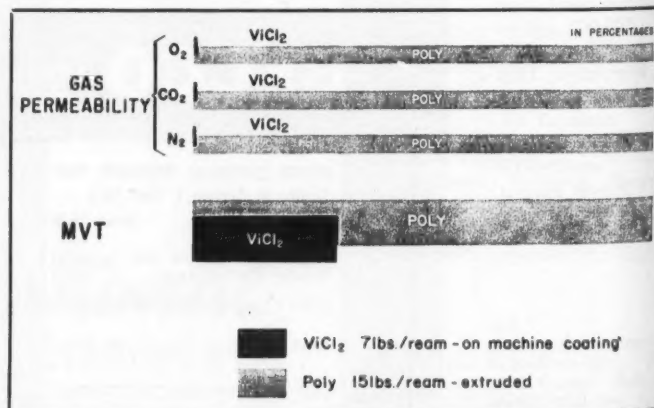
Several solution and latex forms of this resin, which could be coated rather than laminated, have been made available. None offered a combination of protective properties, high-speed machineability and stability which would make it preferable to other coating materials.

Many packaging-materials manufacturers turned to polyethylene which can be laminated in its film form, or more commonly extruded onto other surfaces from its molten resin form. While polyethylene resin is comparatively inexpensive, protective properties it offers are not adequate for every application. In addition, these converting operations require special equipment and are costly.

OUTSTANDING barrier and protective properties of polyvinylidene chloride can now be economically given to materials such as paper and paperboard, corrugated liner board, aluminum foil and even other plastic films. Latex form of polyvinylidene chloride can be applied by high-speed coating equipment and imparts to the substrate materials all the

outstanding properties of the polymer in film form.

Application by standard coating equipment has been fully tested by several producers of paper and paperboard. Properly coated materials have an extreme degree of water resistance, chemical inertness, non-flammability and almost total resistance to transmission of carbon dioxide,



Transmission rates of polyvinylidene chloride (ViCl₂) and polyethylene (Poly) coated bleached board. MVT = Moisture Vapor Transmission

Check 3695 opposite last page.

polyvinylidene chloride to coated substrates

Significant advantages of polyvinylidene chloride coating

- 1) Excellent barrier against passage of water.
- 2) Lowest moisture vapor transmission rate of any known commercial coating (about 1/3 that of polyethylene).
- 3) Resistance to transmission of gases (oxygen, nitrogen, carbon dioxide) resulting in a most effective protection of freshness of packaged items. This resistance is on the order of 1000 to 2000 times greater than polyethylene.
- 4) Non-blocking on exposure to drying and finishing operations normally encountered on paper manufacturing equipment.
- 5) Almost completely non-reactive to chemicals.
- 6) Ultimate tensile strength and rupture resistance about three times that of polyethylene.
- 7) Good release of materials with which it comes into contact.
- 8) Maximum resistance to grease and oil penetration.
- 9) Excellent fire retardancy.
- 10) Resistance to discoloration on aging.

nitrogen, oxygen and other common gases. Rate of moisture-vapor transmission is reported to be lower than that found with any other known commercial coating.

Latex material, called Resyn® 3600, forms coating unaffected by grease and common automotive lubrication oils when properly applied. It will also completely resist attack during prolonged exposure to common acids, alkalis and solvents in most concentrations.

Keeps Foods Tasty

First applications of this latex will be in the paper, corrugating and packaging fields. Extreme resistance to transmission of water vapor and common gases is essential to freshness protection in food packaging particularly. On-machine coating techniques and equipment have been used in applying a polyvinylidene chloride coating to food grade bleached board . . . the material from which most food cartons are made.

Because of the grease resistance, a container made from a paperboard-resin combination could be considered a strong possibility for packaged lube oils. This would be considerably less expensive than conventional metal cans and permit easier disposal of empty containers.

Chemical Packaging Uses Loom

Since the coating resists acids, alkalis and solvents, it is expected to find wide application in manufacture of fiber drums used to package chemicals and other industrial products. Chemical and water resistance, combined with non-flammability, non-blocking, flexibility, dry cleanability and wash resistance, should secure wide usage in textile industry.

It may be used for coating, impregnating and as a non-woven binder, particularly for industrial fabrics. Products of this type are widely used as shoe lining, filter cloths, awnings, interlinings, felts and carpets.

To next page

NALCAMINE G-39M

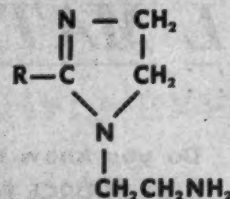
*... This low cost fatty diamine
makes high quality
corrosion inhibitors!*

*Here's
Why!*

- It is strongly adsorbed on metallic surfaces . . . Contains two cationic centers, making it a really powerful surface active agent.
- It is readily pourable, for easiest handling.
- It exhibits excellent stability in corrosive environments.
- It is soluble in hydrocarbons . . . as the free diamine or as its salts of high molecular weight acids.
- It makes normally water-accepting surfaces oil wettable.
- It can be alkylated, oxyalkylated, quaternized or converted to salts of acids by neutralization.

Nalcamine G-39M has been designed expressly for use in products where pharmaceutical purity and color are not required. Thus it offers you all these important properties for a top corrosion inhibitor at a really down to earth cost!

THIS IS NALCAMINE® G-39M



Nalcamine G-39M is a mixture of diamino imidazolines, consisting predominantly of the diamine shown above where the mixed alkyl chains are heptadecenyl and heptadecadienyl.

TYPICAL ANALYSIS

Apparent Molecular Wt.	422
Apparent Combining Wt.	211
% Imidazoline	94.0
% Titratable	99.2
Spec. Gravity at 60°F.	0.948
Pour Point °F.	25
Viscosity at 60°F. cps.	334
Density—Lbs. per gallon	7.91
Color	Black

SHIPPING

Nalcamine G-39M is shipped in fifty-four gallon, bung, unlined, non-returnable steel drums. Weight of each drum is approximately 420 lbs.

HANDLING

Nalcamine G-39M can be handled or stored in iron or mild steel. It should be stored in a closed container.

NALCO CHEMICAL COMPANY

6294 West 66th Place

Chicago 38, Illinois

Subsidiaries in England, Italy, Mexico, Spain, Venezuela and West Germany

In Canada—Alchem Limited, Burlington, Ontario

Nalco

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Check 3696 opposite last page.

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George Shulman
Technical Director
Pfister Chemical Works
Ridgefield, New Jersey



“My Chief Interest in CHEMICAL PROCESSING is in the *CHEMICAL MATERIALS SECTION*”.

Do you know that CHEMICAL PROCESSING IS YOUR BEST SOURCE FOR INFORMATION ON DEVELOPMENTS AND USES of CHEMICAL MATERIALS?

Over 450 editorial pages of latest information on developments and uses of Chemical Materials appeared in **CHEMICAL PROCESSING** during the past five years — far more than you could find in any other major chemical magazine during this time.

Mr. Shulman finds that editorial and advertising in the chemical materials section helps “develop ideas for a new slant on our processes.”

Because of the diversity of his interests and responsibilities within his company, **CHEMICAL PROCESSING**'s broad editorial coverage of the phases of the field is ideally suited to reader Shulman's tastes.



**CHEMICAL
PROCESSING**

**THE ONLY INDUSTRY MAGAZINE
SERVING THE INTEREST OF PROCESSING MANAGEMENT.**

CHEMICAL MATERIALS

Polyvinylidene Chloride

From preceding page

Other end use possibilities include multiwall sacks, labels, building papers and masking paper.

In FDA Extended Category

Resyn 3600 has been reviewed by both Meat Inspection Division, Department of Agriculture, and the Food and Drug Administration of the Department of Health, Education and Welfare. The MID has no objection to use of paperboard coated with the resin in direct-contact packaging of meat and meat food products.

It is considered in the extended category under the Food Additive Amendment, by the Food and Drug Administration. Components of the resin have either been cleared or given an extension of one year for use in food containers, consistent with good manufacturing practice.

Product is a water dispersion of polyvinylidene chloride resin. Solid particles contained in this material are 0.05 micron size. It is a flexible polymer system, supplied at 50% solids. Problem of discoloration on aging, heretofore a drawback in dispersion form of polyvinylidene chloride resins, has been alleviated. This is a highly stable latex and may be stored or shipped over long distances without risk of breakdown. Resulting film can be glued. Adhesives have been developed to take care of major converting operations.

Polymer is produced by the copolymerization of vinylidene chloride monomer with other monomers under pressure, in the presence of catalysts, water, wetting agents and other components.

A special facility for manufacture of Resyn 3600 is now being constructed at company's Meredosia, Illinois, plant. Chemical Plants Division of Blaw-Knox Corporation has been awarded the construction contract. Initial capacity of this plant will be some 14 million lb annually. However, plans call for subsequent expansion both in ca-

CHEMICAL MATERIALS

capacity and plant space. Experimental quantities of resin will be available at \$0.45/dry lb.

(Resyn 3600 is the product of National Starch and Chemical Corporation, 750 Third Ave., New York 17, N.Y.)

Check 3697 opposite last page.

Addendum addendum— more developmental chemical materials

Here are some additional chemicals introduced on a developmental scale during the past 12 months. For the major listing see CP, June 1960, page 49

Polyethylene Film (Cryovac Type L) — Irradiated shrinking film. High dynamic shrink energy and strength for contour packaging.

Epoxy Plasticizer (Hatco 16) — Liquid plasticizer, stabilizer for vinyl, related copolymers. Heat and light stable.

Dimonium Phosphate — Gran fertilizer used alone or in combination. Applied directly on soil.

Ester, Polymeric (Hatco 640) — Liquid vinyl plasticizer with excellent permanence.

Silica Gel (Dri Die) — Powder insecticide. Destroys with odor or noxious effect, on contact.

W. R. Grace & Co., 3 Hanover Square, New York 5, New York.
Check 3698 opp. last page.

Plasticizing Oil, Aromatic (Nevinol A) — Liquid plasticizer solvent, heat transfer agent, pigment dispersant. Light color, low odor, durable.

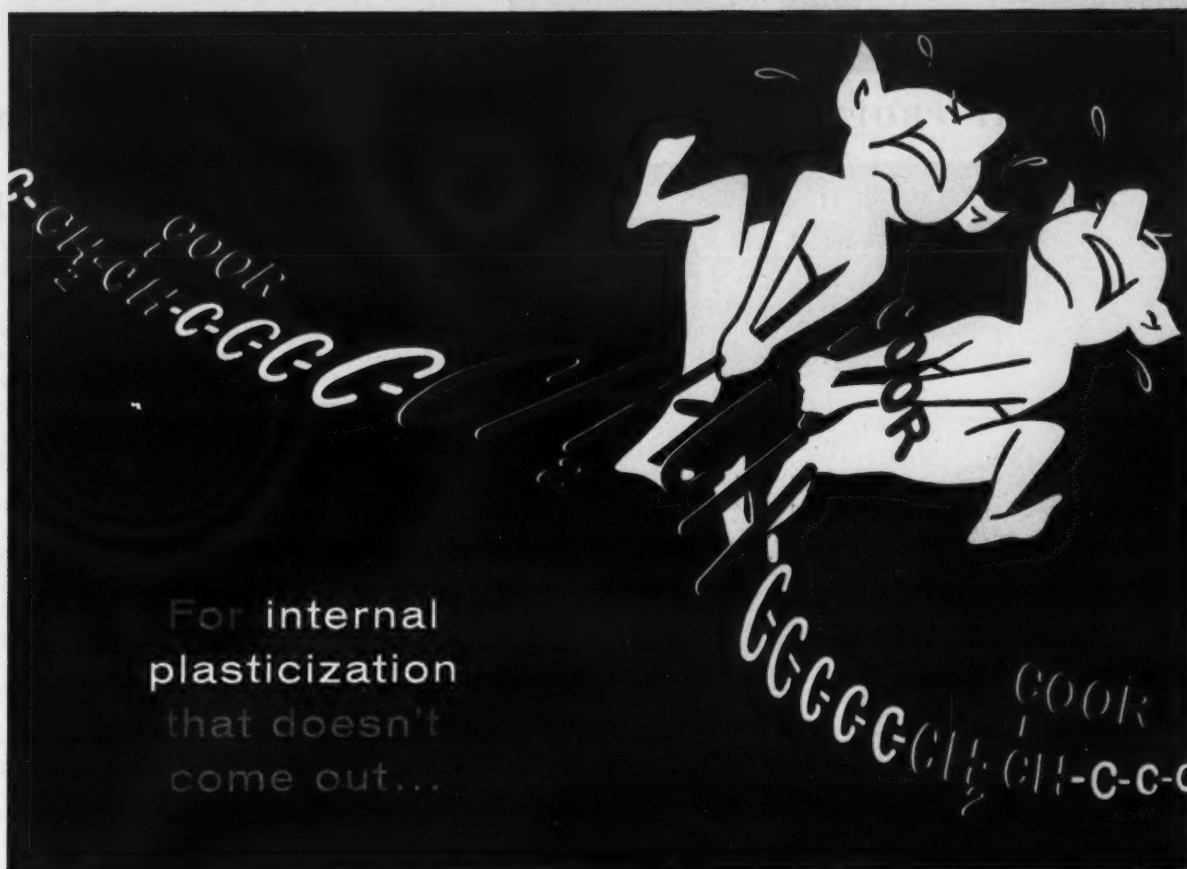
Neville Chemical Co., Neville Island, Pittsburgh 25, Pennsylvania.
Check 3699 opp. last page.

Chemiquat Alpha — Quaternized polymerized ethylene imine salt, water soln. Flocculating, antistatic agent. Non-discoloring, highly cationic.

Chemical NHP — Hydroxy-alkylated polymerized ethylene imine, water soln. Flocculating agent.

Acylated Polymerized Ethylene Imine — Pastes and emuls. Paper and textile size.

Chemirad Corporation, PO Box 96, Milltown, N. J.
Check 3700 opp. last page.



For internal
plasticization
that doesn't
come out...

copolymerize with

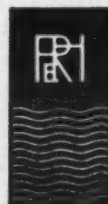
BUTYL ACRYLATE or 2-ETHYLHEXYL ACRYLATE

Are you troubled with plasticizers that volatilize, migrate, or are extractable by solvents? Why not try plasticization that doesn't come out—internal plasticization? By copolymerizing monomers such as styrene, methyl methacrylate, vinyl chloride or many others with butyl acrylate or 2-ethylhexyl acrylate, you can produce a copolymer with a lowered brittle point, and thus achieve internal plasticization. This effect is shown in the table below. Since the acrylic plasticizing agent is linked chemically in such copolymer chains, it does not migrate nor volatilize—nor can it be extracted even by the strongest solvents. Furthermore, these copoly-

mers can be processed at lower temperatures, form films more readily at low temperatures because of improved flow properties, and have better resistance to deterioration by heat and light. Copolymers containing butyl acrylate or 2-ethylhexyl acrylate are useful in the production of latex paints and other types of emulsion and solution coatings, textile finishes, packaging films, paper coatings, leather finishes, adhesives, and elastomers. Write to Dept. SP-17 for literature on butyl acrylate, 2-ethylhexyl acrylate and other acrylic monomers.

Brittle Points for Copolymers of Methyl Methacrylate with
Butyl Acrylate or 2-Ethylhexyl Acrylate

Brittle Point	Weight Percent Comonomer with Methyl Methacrylate	
	Butyl Acrylate	2-Ethylhexyl Acrylate
0°C.	40	35
-20°C.	60	45
-40°C.	80	60

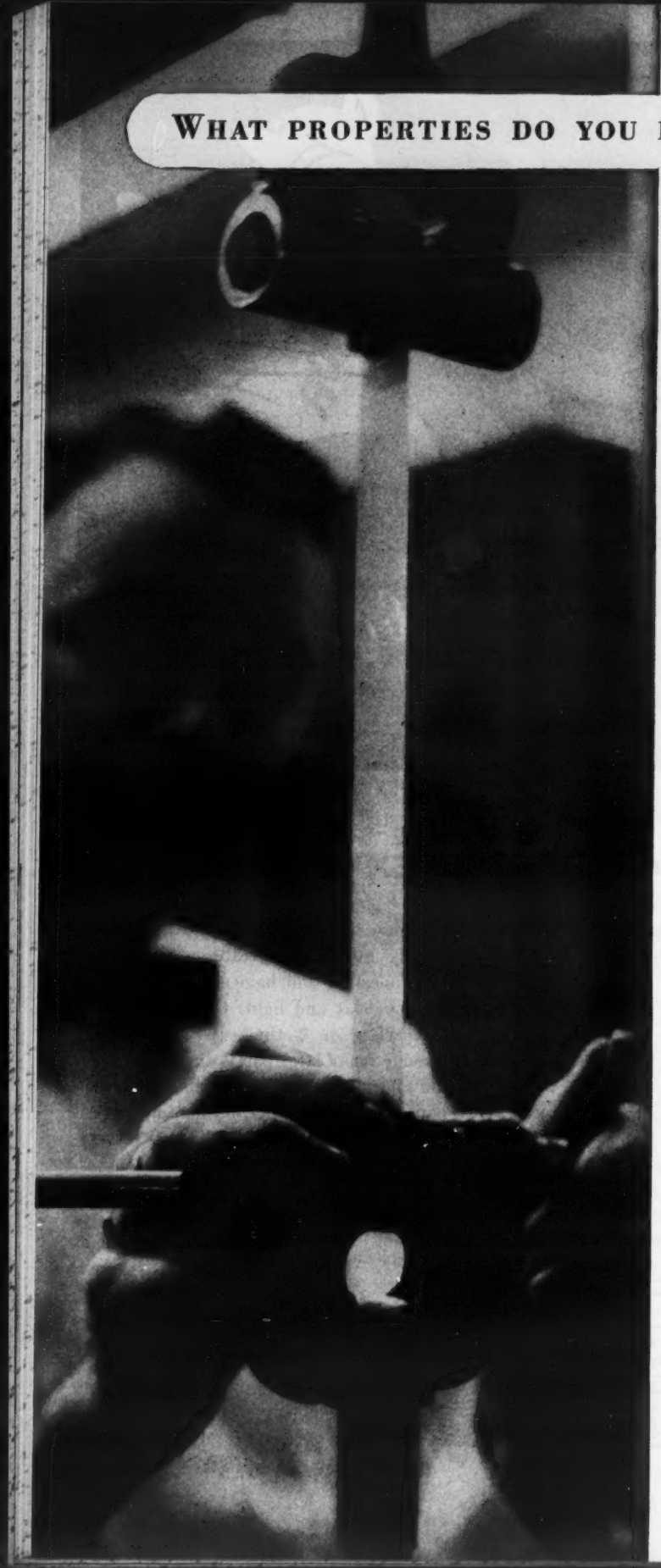


Chemicals for Industry

**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Check 3701 opposite last page.



WHAT PROPERTIES DO YOU NEED IN VINYL PLASTICS?

Build them in with FLEXOL plasticizers!

The many different end uses for vinyl plastics each demand special properties. Each of CARBIDE's 15 FLEXOL plasticizers is designed to contribute one or more distinctive properties. Our technical representatives can help you select the plasticizer that will do your job best!

FLEXOL plasticizers DOP, 426, and 810 are designed to give an excellent balance of properties—good compatibility, low volatility, low-temperature flexibility, and superior electrical qualities. Other FLEXOL primary plasticizers have specialized properties. FLEXOL 10-10 possesses low volatility and good extraction resistance; FLEXOL 380 imparts outstanding lacquer mar resistance; and FLEXOL CC-55 has good viscosity characteristics and excellent fusing action in plastisols.

For vinyl plastics that must perform at extremely low temperatures, there are three special plasticizers, FLEXOL A-26, 10-A, and TOF. These are used to make vinyl plastics that are both impact resistant and flexible at temperatures as low as -70°C .

In some cases, CARBIDE has developed a plasticizer for a single use. For example, FLEXOL Plasticizer 3GH is used for the polyvinyl butyral interlayer in safety glass. This plasticizer increases adhesion and eliminates the need for edge sealing. Besides FLEXOL 3GH, CARBIDE produces six other special-purpose plasticizers, FLEXOL 3GO, 4GO, 8N8, R-2H, and B-400.

All 15 FLEXOL plasticizers are available from distribution points throughout the country. And, because of CARBIDE's wide variety of plasticizers, you can take advantage of the savings from combination tank car, tank wagon, and drum orders in ICL or carload orders. For more information on FLEXOL plasticizers, call the nearest CARBIDE office or write Department B, Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, New York.

FLEXOL and UNION CARBIDE are registered trademarks.

**UNION CARBIDE
CHEMICALS COMPANY**



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If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

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to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at left, specify 3702 see information request blank opposite last page.



CHEMICAL MATERIALS

Nitrocellulose lacquers protected from UV light by two absorbers

Uses: Ultraviolet absorbers are particularly suitable for protecting nitrocellulose lacquers against UV degradation. They can also be used in other systems such as butadiene-styrene latex, melamine-formaldehyde, urea-formaldehyde, epoxy-amine and nylon formulations.

Features: Materials do not contain acidic aromatic hydroxyl groups and show excellent UV absorption properties under varying pH conditions. They do not add undesirable color to coatings.

Description: Absorbers, designated Uvinul N-35 and Uvinul N-38, are chemically identified as substituted acrylonitriles.

(Uvinul N-35 and N-38 are products of Dyestuff and Chemical Division of General Aniline & Film Corp., 435 Hudson St., N.Y. 14, N.Y.)

Check 3703 opposite last page.

Uniform, contaminant-free synthetic wax line now available

A series of nitroparaffin-derived synthetic waxes have been made available. Two of the waxes are available in commercial quantities.

TX-1 is a hard, high-melting, emulsifiable rosin-like wax, light-brown in color and translucent in appearance.

TS-254 is hard, medium-melting, emulsifiable and cream colored.

Both form true solutions in many organic liquids, which at higher concentrations become stable gels or pastes.

Manufactured under close control, they are marked by uniformity and freedom from contaminants. They are suggested wherever natural or synthetic waxes are used.

(Oxazoline waxes TX-1 and TS-254 are products of Commercial Solvents Corporation, 260 Madison Ave., New York 16, New York.)

Check 3704 opposite last page.

We're Adding to Our Staff ...Need Good Man

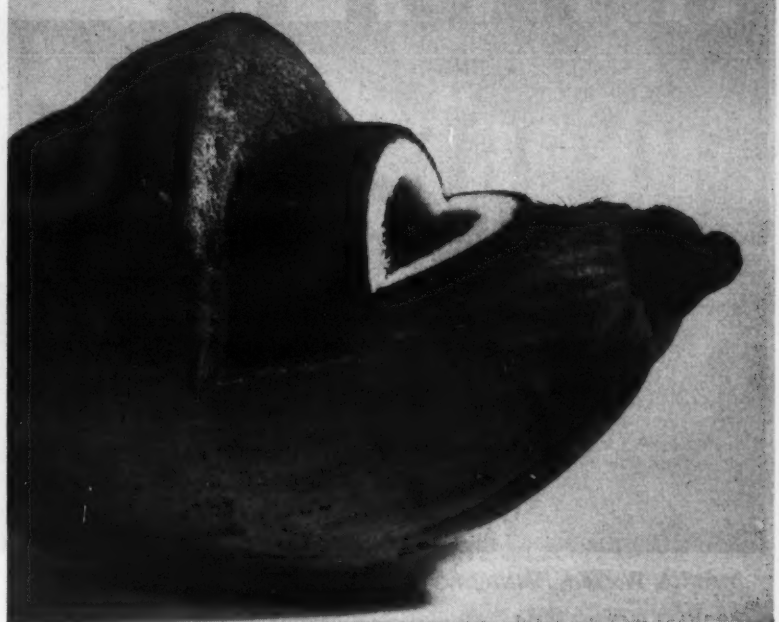
CHEMICAL PROCESSING magazine is expanding its editorial staff.

We want a man with good knowledge of chemicals, markets and producers, plus ability to dig out and interpret facts of top interest to industry. He must possess writing experience that indicates promise of rapid development into top producer. He should also have some familiarity with chemical plants and equipment.

A degree in chemistry—or perhaps chemical engineering with work experience heavy on chemical materials—is a requirement.

Send your concise resume to Dana B. Berg, Executive Editor, CHEMICAL PROCESSING Magazine, 111 East Delaware Place, Chicago 11, Illinois.

USE COCONUT OIL FATTY ACIDS OR METHYL ESTERS?



Foremost-El Dorado's non-secret ingredient... is EXPERIENCE

When you specify Foremost-El Dorado fatty acids or methyl esters, you're buying products from people who are specialists in the field. For over 65 years, Foremost-El Dorado has been producing the highest quality coconut oil products available.

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Capric	Cocoleic
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Myristic	Coconut

METHYL ESTERS

Caproate	Palmitate
Caprylate	Oleate
Caprate	Eldo* 18
Laurate	Coconate
Myristate	

*T. M. Reg.



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P. O. Box 599, Oakland 4, California

Check 3705 opposite last page.

NEROFIL

A Family of
Specially-
Processed
Carbon-Based
Filteraids



Mr. Roy Warren, Plating Foreman, Ford Motor Co. Monroe Plant

INDUSTRIES' TROUBLE SHOOTER

All plating solutions require insoluble, compatible filteraids for maximum efficiency and plating solution quality at minimum cost. Nerofil filtration of various plating baths has resulted in satisfactory levels of filteraid solubility, insuring adequate efficiency, clarity and flowrates throughout filter cycles. Plating roughness has been controlled, resulting in a minimum number of rejects.

Nerofil was developed for all difficult filtrations and is available in a full range of six grades, for any application you may have. Other important advantages are—Uniform Quality—Physically and Chemically Stable—Combustible Filtercake—Fast Flowrates, Good Clarity—Lower Cake Density Gives Additional Savings.

Whatever your filtration problem may be, our staff of qualified filtration engineers will be ready to assist in its evaluation. Through its Dicalite Dept., Great Lakes Carbon Corp. has for a generation been of service to industry in the solving of filtration problems. Write today for your free Nerofil Brochure.



NERO PRODUCTS DEPT.
Great Lakes Carbon Corp.
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Chicago 1, Ill.

Yes, I'd like information on Nerofil for ☐ Filtration ☐ Other Use

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POSITION _____

COMPANY _____

ADDRESS _____

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Check 3706 opposite last page.

CHEMICAL MATERIALS



Spot Bonding of Teflon

Treating and bonding kits for Teflon have been made available. Kits permit spot bonding of Teflon to itself or to other materials. First, a treating agent is applied to selected portions of the Teflon surface. This creates a carbonaceous film in areas where bonds will be made. Bonding agent is applied (general-purpose epoxy formulation) and component assembled.

Spot bonding technique is proving particularly useful where electronic qualities of Teflon in high-frequency circuits were being adversely affected when a continuous adhesive layer was used.

(PA-746 Treating and Bonding Kits are product of Plastics Associates, 2900 S. Coast Blvd., Laguna Beach, Calif.)

Check 3707 opposite last page.

Maintains permanent bond in pressure-sensitive adhesive formulations

Polyvinyl ethyl ether resin has continuous tackiness

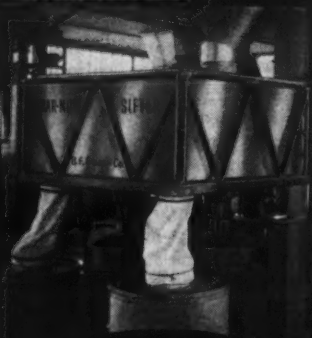
Uses: Resin provides binding force for pressure-sensitive adhesives. Product maintains a permanent bond to paper, cloth, glass, wood, masonite, hardboard and polyester films. It can be applied by spraying or extrusion coating.

Features: Resin is said to provide a permanent tackiness and bonding strength. This adhesive quality does not diminish. A pound of resin can supply a permanent adhesive to an area as great as 35,000 sq in.

Description: Polyvinyl ethyl ether resin is produced by polymerizing vinyl ethyl ether, a clear liquid. Three grades of resin are produced. Two higher-molecular-weight versions are soft, light-amber-colored, rubbery solids. A lower-molecular-weight ver-

do you
screen or
size dry
chemicals?

laboratory
pilot plant
production



Get bonus performance

with the
BAR-NUN SIFTER

Do you need to grade a material by particle size . . . screen out oversize and undersize particles . . . remove lumps or foreign materials . . . or make any type of particle-size separation? Then you want these Bar-Nun Rotary Sifter advantages:

- Accurate separations in large volume, produced in limited floor space.
- Screens totally enclosed by dust-tight, all-metal box. Optional stainless steel construction.
- Easy cleaning. Flip-action clamps permit quick opening of box, and easy removal of screens for thorough cleaning.
- Smooth, low cost operation. Exclusive, all-mechanical design and rugged construction give trouble-free performance even in continuous service on "hard-to-sift" materials.

For single or multiple separations, as fine as 325 mesh—in laboratory work or big volume, heavy duty production—you'll get bonus performance from a Bar-Nun Rotary Sifter. Users' repeat orders prove it. Write for specific details and recommendations without obligation.

SEND FOR 6-PAGE BULLETIN 503

For details on other Gump processing equipment, refer to your copy of Chemical Engineering Catalog.



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EQUIPMENT FOR THE PROCESS INDUSTRIES

B. F. GUMP Co.

Engineers & Manufacturers Since 1872
1344 S. Cicero Avenue • Chicago 50, Illinois

Check 3708 opposite last page.

CHEMICAL PROCESSING

sion is a viscous amber-colored liquid. Both have a specific gravity of 0.97, and can be shipped either solvent-free or as solutions in hexane.

Lower-molecular-weight material is extremely tacky. Higher-molecular-weight product is more rubbery, stronger and less tacky in nature. Two materials can be blended by formulator to achieve specific qualities for different applications.

In normal coating thicknesses, material is colorless and may be used on clear plastic films. It is compatible with rosin and rosin derivatives.

(Polyvinyl ethyl ether resin is product of Union Carbide Plastics Company Division of Union Carbide Corporation, 420 Lexington Avenue, New York 17, New York.)

Check 3709 opposite last page.

**High germicidal action
combined with low-cost
in quaternary compound**

Uses: Product is designed especially for industrial water treatment. It also has potential use in industrial sanitizers, floor cleaners and similar applications.

Features: In brine tests, using only 10 to 15 parts of the product to a million parts of brine, complete inhibition of *Desulfovibrio* bacteria was achieved for up to three weeks. Similar effectiveness was shown in Chambers tests against *Staphylococcus aureus* gram positive bacteria in 500 ppm hard water.

Description: Product is dimethyl tallow-derived furfuryl ammonium chloride called Adogen 446. It is soluble up to 40% in tap water and 20% in sea water. It is also soluble in polar organic solvents and in many non-polar solvents. The phenol coefficients of Adogen 446 are in the range of benzyl quaternaries and cetyl pyridinium chloride.

(Adogen 446 is the product of Archer-Daniels-Midland Company, 700 Investors Building, Minneapolis 2, Minn.)

Check 3710 opposite last page.

BRIEFS

**A task for Fluorolube®
A better chlorine carrier
About lauryl mercaptan**



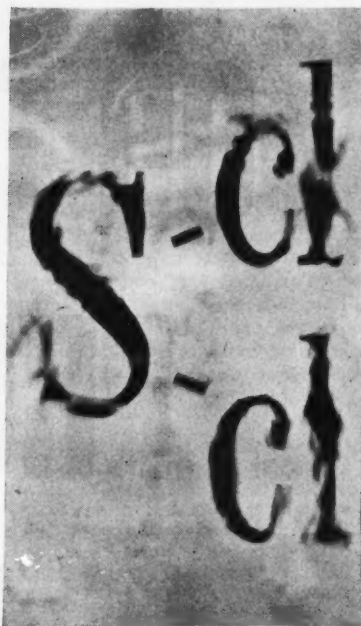
Here, obviously, is a valve that's begging for a shot of lubricant. One that's impervious to oxidants or corrosive liquids. This narrows the field to a very special kind of lubricant: the Fluorolubes (addition polymers of trifluorovinyl chloride).

We use them ourselves on chlorine valves, and find them very good indeed. With old-style lubricants, we had to repack these valves 35 to 50 times a year. With Fluorolube packing, we do it only four or five. Of course the most spectacular uses for Fluorolubes are found in rocketry, where they are applied as coatings and lubricants for parts of missiles in contact with oxygen. They're heat-stable, too. Up to 400° F. We have some literature on Fluorolubes you can get by checking the coupon.

IF YOU WANT REACTIVE CHLORINE ATOMS

A good way to inject chlorine atoms into certain compounds is to use Hooker sulfur dichloride. Examples: chloridizing agent in metallurgy; reagent in manufacture of rubber cements and insecticides; hardener for printing inks.

Since we're in the chlorine business, our background on how to deal with chlorine atoms in usual as well as unusual ways is quite broad. Write us if you have questions—or, if you wish technical information, just check the coupon.



LAURYL MERCAPTAN, A CHEMICAL FOR IDEA MEN

Here is an interesting Hooker product used primarily as a polymerization modifier in the manufacture of "hot type" synthetic rubber. To the imaginative researcher this mercaptan may conjure up some fresh ideas in polymer chemistry. For research samples, please write on your business letterhead. For technical data sheet, check and mail the coupon below.

Typical properties

ANALYSIS:
mercaptan sulfur 14.7-14.8%
chlorine 0.2%
LAST CRYSTAL POINT -7°C
BOILING RANGE AT 5 MM
(first drop to 95%) . . 108-139°C
FLASH POINT 128°C
FIRE POINT 139°C
REFRACTIVE INDEX, N_D20/D . . 1.4582
SPECIFIC GRAVITY AT 15.5°C . . 0.849

For more information, check here and mail with name, title and company address:

- ☐ Fluorolubes, Data File
☐ Sulfur Dichloride, Data Sheet
☐ Lauryl Mercaptan, Data Sheet

HOOKER CHEMICAL CORPORATION

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HOOKER
CHEMICALS
PLASTICS

Check 3711 opposite last page.

**Chelating costs cut by 1/3
with high potency agent,
nitrilo triacetic acid**

Recently developed synthesis has resulted in a high potency chelating agent, nitrilo triacetic acid. Product makes it possible to obtain up to 50% more chelating power and reduce cost by 1/3. Only 191 grams of NTA are necessary to chelate one gram mole of metal compared to 292 grams of EDTA (ethylene diamine tetraacetic acid).

Product is compatible with soap, synthetic detergents and builders, and can be combined with phosphates in heavy-duty detergents. It is recommended for compounding paint strippers, rust removers and bottle washing compounds.

(NTA is the product of Hampshire Chemical Corporation, Nashua, N.H.)

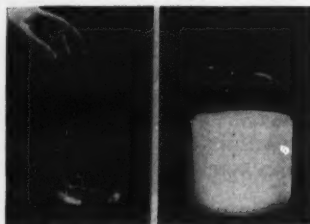
Check 3712 opposite last page.

**Water-base paint stability
Improved with fluid
lecithin concentrate**

Products show better flow and working consistency

Uses: Fluid was developed especially for use in formulating water-base paints.

Features: In developmental tests product improved stability of water-base paints



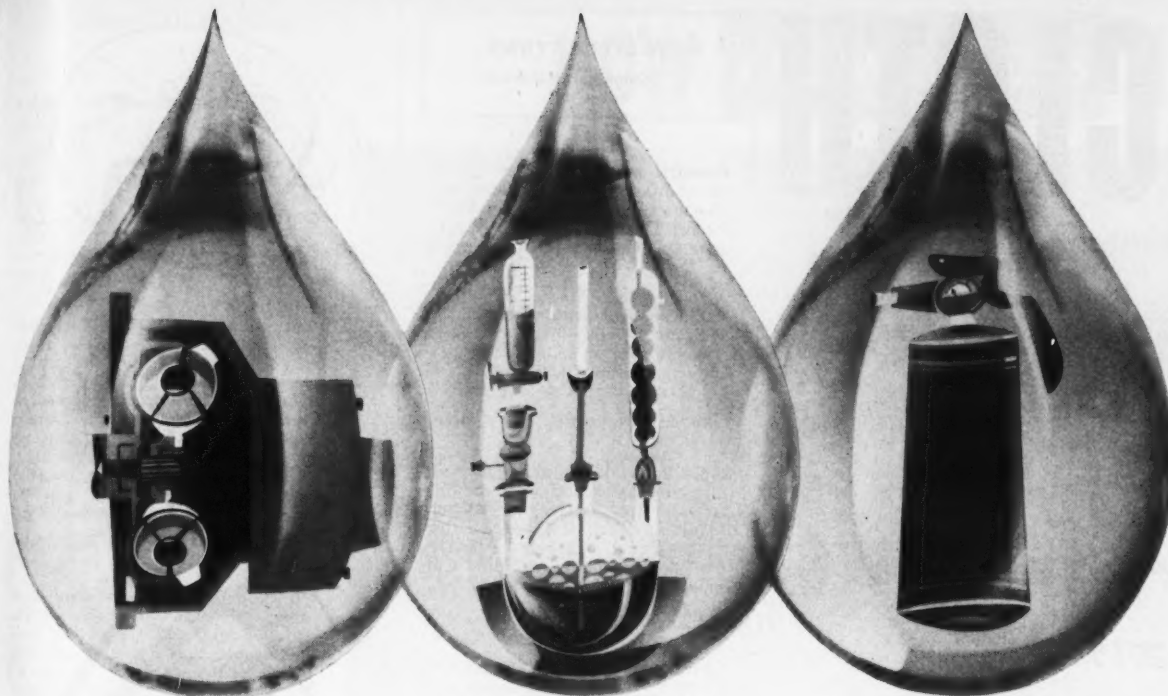
Lecithin concentrate stabilizes water-base paint emulsions

by stabilizing the emulsion, preventing pigment migration, retarding pigment settling, and preventing hard pigment pack in long storage. Paints showed improved flow and working consistency, easier brush or roll out, reduced lap marks, increased hiding power and color



BROMINE DEVELOPMENTS

RESEARCH CREATES NEW USES FOR THE UNIQUE PROPERTIES OF BROMINE

**Build High Density Fluids**

Bromine is more than three times heavier than water. Hydraulic engineers, for example, find this property valuable in developing high density fluids to make possible more compact hydraulic systems without sacrificing efficiency.

React Fast

Because bromine is highly reactive, it's extremely easy to add bromine onto a compound, or to take it off. With bromine or brominated compounds, the reactions are fast, often avoid undesirable side-reactions, unwanted by-products.

Fight Fire

During World War II, specialized military fire-fighting jobs began to rely on certain brominated compounds for fast action. Use has spread to industrial applications, and current research shows additional bromine compounds of great value.

For years, the unique properties of bromine and brominated compounds have sparked the creative imaginations of scientists. In fact, they've found hundreds of individual uses, and the list keeps on growing! The three characteristics described above stand out in the spotlight of current development work to improve commercial products and processes . . . and to make new ones possible.

Most likely, new developments for *your company* depend on industrial chemicals and technical knowledge to put them to work. When your needs call for bromine or brominated

compounds, we suggest you call in Dow. Our latest investigations are in the areas of new fast-acting chemical intermediates, high density fluids and fire-fighting agents.

Besides providing highly pure elemental bromine, Dow also upgrades it into hundreds of compounds—both standard items and chemicals compounded to "prescription." New brominated compounds are constantly being studied. Furthermore, Dow offers its research facilities and vast experience for developing bromine's ability to serve your particular needs. For further information, return the coupon below.



Bromine was Dow's first product. The sketch shows founder Herbert Dow's first plant where, in 1891, he perfected the electrolysis method for producing bromine in commercial quantity from brine wells in Midland, Michigan. Later, Dow pioneered the recovery of bromine from sea water. In the past decade, Dow also pioneered the bulk shipment of bromine. Today, The Dow Chemical Company with expansive modern facilities continues as a major producer of high-quality bromine and its compounds, with nearly 70 years' background of experience and highly developed knowledge.

Chemicals Merchandising Dept. 60-650LGS, The Dow Chemical Company, Midland, Michigan.

Send information about:

- ☐ Bromine and brominated compounds
☐ Chemical intermediates
☐ High density fluids
☐ Fire extinguisher fluids

We are interested in bromine for use in

NAME _____
 TITLE _____
 COMPANY _____
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 CITY _____ ZONE _____ STATE _____

Send
coupon
today

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

Check 3713 opposite last page.

strength in the test program.

Description: Fluid lecithin concentrate is compatible with all usual thickeners such as casein, soya protein and carboxymethyl cellulose. It is a complex mixture of natural soybean-derived phosphatides containing liposols, cephalin and lecithin.

In paint formulations, 1-3% of total pigment weight of concentrate tends to form a monomolecular layer around pigment particles, promoting rapid wetting and break-up of aggregates. This facilitates mixing and grinding, and permits reduced grinding time or increased pigment concentration in premix.

(Emultex R lecithin compound is the product of A. E. Staley Manufacturing Company, Decatur, Ill.)

Check 3714 opposite last page.

**Blow-molding role
predicted for this
polyethylene**

Resin has high stiffness,
stress-crack resistance

Uses: Resin is specifically designed for blow molding and injection molding.

Features: Resin, with a density of 0.924 and a melt index of 2.0, is characterized by high stiffness, good stress-crack resistance, excellent appearance and easy processability.

Description: Polyethylene molding resin, Petrothene 101, has a torsional modulus of elasticity of approximately 18,000 lb/sq in higher than similar polyethylene resins now available. A thin-wall tube, (filled with commercial detergent, and sealed at both ends by metal closures prepared for corrosion resistance) showed no sign of failure after four months exposure at a temperature of 120°F.

(Petrothene 101 is product of U.S. Industrial Chemicals Co., Div. of National Distillers & Chemical Corp., 99 Park Avenue, New York 16, N.Y.)

Check 3715 opposite last page.

WIRE CLOTH

for
FILTERING
SIZING
STRAINING
TESTING

In all metals, in all weaves
... woven to the highest accuracy
standard in the industry. You just can't
buy a better wire cloth than "NEWARK."
Hundreds of meshes, weaves and metals to fit your
specific need. Years of processing experience to
help you pick the right wire cloth for your
application. Write for Bulletin FC or write us about
your problem. Fast deliveries, best cloth,
lowest cost when you call on NEWARK.

NEWARK
for ACCURACY

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COMPANY

381 VERONA AVENUE • NEWARK 4, N. J.

Check 3716 opposite last page.

NEW LITERATURE

Chemical Materials

Potential nonnuclear uses for depleted uranium are discussed in a 58-page report available for \$0.75. Report TID-8203 — U. S. Department of Commerce, Washington 25, D.C.

Radiochemical catalog lists over 400 compounds, many of which are available in AEC license-exempt quantities. Cat Schedule F—Nuclear-Chicago Corporation.

Check 3717 opposite last page.

Phenolic molding materials with fast cure times and wide molding latitudes are described in brochure "Molding Technical Release No. 40" — Union Carbide Plastics Company, Division of Union Carbide Corporation.

Check 3718 opposite last page.

Chromium chemicals are comprehensively covered in 80-page technical bulletin. Numerous graphs and charts are used to illustrate such properties as density, solubility, freezing point, viscosity and pH of solutions. Chromium chemicals Bul—Solvay Process Division, Allied Chemical Corporation.

Check 3719 opposite last page.

Polyethylene in powder form, what it does, and how it is made are explained in booklet of eight-pages. Techniques for using the material are also detailed. "Microthene-Polyethylene in Powder Form"—U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation.

Check 3720 opposite last page.

Laminated Plastics Selection Guide is a two part presentation which combines a 12-page manual with a quick-reference chart of characteristics for 21 commonly used laminate grades. Manual includes considerable handbook information for specifying and ordering laminated plastics. "Laminated Plastics Selection Guide"—Taylor Fibre Co.

Check 3721 opposite last page.

Chemical processing equipment made with Penton chlorinated polyether is detailed in 20-page, pocket size technical bulletin, "Penton Buyers Guide" — Hercules Powder Company.

Check 3722 opposite last page.

Tall oil fatty acids are subject of four-page report which outlines availability, uses, storage and handling. Bul No. 19 — Pulp Chemicals Association.

Check 3723 opposite last page.



The Squeeze Is on FOAM
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Silicone Defoamers*

There's a right tool for every job. In foam control it's Dow Corning silicone anti-foamers or defoamers... job-proved thousands of times over as the most efficient, most economical, and most versatile foam suppressors available.

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Please rush a FREE SAMPLE of a Dow Corning silicone defoamer for my product or process, which is (indicate if food, aqueous, oil or other):

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CHEMICAL PROCESSING

HOW **HERCULES** HELPS...

Uses of potassium permanganate are discussed in 36-page technical brochure. Product is extensively used as an algicide, bactericide and insecticide. "Properties and Uses of Potassium Permanganate" may be obtained on letterhead request from End-Use Research Department, Carus Chemical Company, Inc., Box 364, La Salle, Ill.

Refractory metal chart shows complete properties of tungsten, tantalum, molybdenum and columbium. Colorful chart makes it easy to compare four metals for such properties as working temperature, magnetic susceptibility and thermal characteristics. Reverse side is temperature conversion table. Refractory metal chart — Fansteel Metallurgical Corporation.

Check 3725 opposite last page.

Polyvinylpyrrolidone formulations are presented in 22-page guide to new and improved products incorporating this material. More than 30 specific products in five major groups are described. Details include required ingredients and suggested techniques of manufacture. Booklet No. AP-98 — Antara Chemicals Div., General Aniline & Film Corporation.

Check 3726 opposite last page.

Hexahydrophthalic anhydride's characteristics and suggested uses are outlined in 17-page booklet which lists chemical and physical properties, physiological hazards and handling procedures. Brochure I-2R — National Aniline Div., Allied Chemical Corporation.

Check 3727 opposite last page.

Wide range of amino acids, peptides, carbohydrates, and hundreds of other items of interest to research workers in the fields of biology and nutrition are listed in 60-page catalog. Each page lists item, weight and price in this completely indexed publication. General Biochemicals Cat — General Biochemicals, Inc.

Check 3728 opposite last page.

Electronic applications of Lexan polycarbonate resin are covered in illustrated folder CDC-375 — Chemical Materials Department, General Electric Company.

Check 3729 opposite last page.

Acrylic-resin-coated glass fabrics and laminates for electrical insulation are detailed in catalog of eight pages. Charts and graphs outline electrical strength, mechanical toughness, stability, chemical resistance and other properties. "Lecton" Bul—Fabrics Division, E. I. du Pont de Nemours & Co.

Check 3730 opposite last page.



SET A TUNNEL DRIVING RECORD—For New York City's latest water tunnel, a 43.64 mile bore was completed in the record time of 841,000 man-days—ten months ahead of schedule. Clancy O'Dell, project manager, depended on Hercules® short-period

electric blasting caps. Pioneering in the field of industrial explosives has always been part of Hercules' history and this extensive background is available through a world-wide staff of explosives technical service men.



IMPROVE CLEANING COMPOUNDS—New type liquid cleansing agents often depend upon Pamak® tall oil fatty acids for added effectiveness. Pamak is just one of the many Hercules products that is a part of today's formulations for modern cleaning compounds and liquid detergents.



PROTECT INDUSTRIAL EQUIPMENT—Protective coatings based on Parlon®, Chlorinated natural rubber, are being used from coast-to-coast. A typical example of the outstanding performance of Parlon coatings is at the Middlesex County Sewage Disposal Center in Sayreville, N. J., where a Parlon-based paint has been selected to protect equipment under extremely challenging conditions.

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CHEMICAL MATERIALS FOR INDUSTRY



060-5

Check 3731 opposite last page.



This typical G-W Eppenbach Agi-Mixer is fully jacketed. Hydraulic lift raises mixing assembly. Contact parts are stainless steel.

only Agi-Mixers give homogenizing paddle mixing at the same time!

...That's why hundreds of users have found G-W Eppenbach Agi-Mixers just about the most useful processing equipment they possess.

Rotating paddles with teflon scraper blades work unrefined material down from the edges and top of the kettle to the high-speed, high shear Homo-Mixer homogenizing head. Here the material is drawn through small clearances between a precision turbine and stator, and ejected upward against an adjustable deflector plate. At this point the paddles again direct the material down, and this cycle is repeated until the entire mass is properly homogenized and blended.

G-W Eppenbach Agi-Mixers are built for rugged, exacting, time-saving service, and have scores of uses in processing pastes, creams, batters, slurries, gums, adhesives, pigments, resinous and latex compounds, and other viscous products.

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Check 3732 opposite last page.

Foreign Competition Threatens U.S. Chemical Leadership From page 26

to tight supply because of war or threat of war, then premium prices must be paid. So, if financial assistance can be had, they prefer to build and operate their own plants even though the small size of such might not permit highest operating efficiency. Actually, such local plants solve many problems, permit good profits if the projects are properly set up.

"Such projects," explained one executive, "must produce 100% of the country's needs of commodity, and must have two kinds of protection to make them sound. There must be protective tariff, and anti-dumping legislation. Under such an umbrella, it is often possible to achieve a reasonable pay-out, at the same time giving the country a stable, available source of supply."

Ag Chemicals Outlook Optimistic

An enigma is the underdeveloped country's unreadiness for really sophisticated chemical products such as polypropylene, gasoline additives but except, of course, pharmaceuticals — and at the same time it probably lacks

the satellite industry necessary to make use of really basic chemicals, such as chlorine and acrylonitrile, except for agricultural chemicals. It is this sort of problem that would seem to probably fall into the bailiwick of the State Department and United Nations planners.

For agricultural chemicals, however, the underdeveloped nation's problem is simply one of finance. Chemical Construction Company's Strelzoff estimates the world nitrogen production is currently 11 million tons/yr. To just keep up with population growth would take 18 new plants/yr each making 200 tons/day of NH_3 converted to fertilizer, the total costing \$350-500 million each year. India alone needs 20 such plants to catch up with the U.S. consumption rate, which at 14,000 tons/million population is below that of Europe. World average is 4,000 tons; India's, 1,000.

Summing up world ammonia plant prospects, Chemico's sales v-p Fulton says "We're totally optimistic." The only problem seems to be money availability for such long pay-out projects.

Curiously, the Soviet threat does not currently, at least,



"Experienced?!"

loom large in the minds of many chemical people.

Reason: The Soviet Union is admittedly far behind in facilities. But, as everyone must be aware, it will only be a matter of time until not only the Soviet, but also Red China will be additional chemical exporters to worry about. For being state operated, their chemical exports will bear no manufacturing costs.

To some, the chemical materials and plants being sold the Soviets by European firms is a subject of much concern. "We've revealed to Western Europe much of our latest technology," comments one engineer. "So what is to keep them from selling portions of this to the Russians?" This man feels the problem is too involved to try to settle on an individual country basis. It should be a NATO matter, he feels, and he points out there is a NATO committee already set up that could handle problems of this general type.

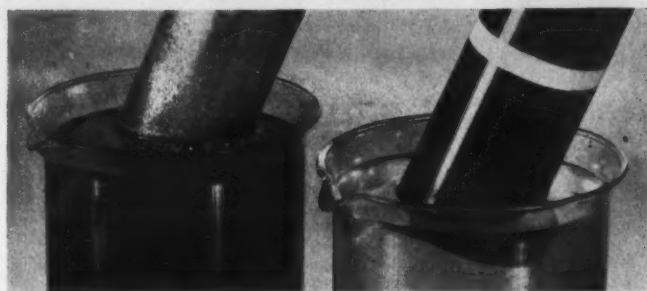
Some Forego R&D

A really surprising fact is that most European firms now in chemicals know they don't have time to research out solutions to problems they know we've already solved, and will license to them. This does not include the few really big firms — CIC, Hoechst, Bayer, etc., who do a large volume of basic as well as well-aimed applied research . . . "these are the ones we must regard as serious competitors in the race for advanced technology," cautions one executive.

So the willingness of the smaller European firms to forego research is a major reason why so much European research capacity has been made available to us. The other reason is the alertness of the Europeans to recognize and find ways to cash in on our large research outlays.

Low Labor Costs Offset

Is low labor hourly cost a major advantage European and Japanese firms have over us? "It is, of course, impor-



TEST PROVES CORROSION RESISTANCE . . . Stainless Steel 316 pipe (at left) and Fibercast Pipe were tested in 54% P_2O_5 solution at 290° F using modified ASTM A-262-55T formula. The stainless steel pipe showed .778" penetration per month; yet the Fibercast showed no deterioration whatsoever.

New pipes eliminate corrosion problems in processing industries!

Chemical processing industries discover that new Fibercast® Pipe and Fittings perform indefinitely with extremely corrosive elements and high temperatures . . . even where other non-metallic pipes fail.



WHAT is Fibercast?

It is centrifugally cast, thermoset, epoxy resin reinforced pipe that handles temperature and pressure problems where no other pipe will do. Its body of woven glass fibers resists high tension forces, is embedded and bonded by heat in epoxy resin. Result: strong, long-lasting pipe that resists high pressures and temperatures in corrosive environments.

WHEN should Fibercast be used?

Whenever ease of handling, light weight, dielectric properties and structural stability are desirable in a piping material that is at the same time outstandingly resistant to heat, pressure and particularly corrosion.

Examples: Petroleum industry . . . chemical . . . petro-chemical . . . nuclear energy . . . textile . . . paper . . . food-processing . . . and countless other operations handling acids, alkalies, salt water and other corrosive liquids under pressure.

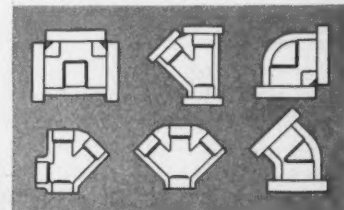
WHY use Fibercast?

Fibercast's remarkable lasting qualities . . . its amazing resistance to



Workman is shown with section of Fibercast pipe bearing 32% HCl at a Shell chemical plant. Note that Fibercast has sufficient strength for installation on span racks with the spacing normally used for metal pipe.

"impossible" temperature and pressure conditions . . . make it a long-lived, cost-saving, maintenance-saving pipe. Remember, too: Fibercast has the world's most complete stock of standard fittings, as well as couplings designed and made to order for individual requirements.



If you would like to learn more about the uses of Fibercast in chemical industries, mail the coupon below.

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FIBERCAST Y **A DIVISION OF**
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SHEET AND TUBE COMPANY

Check 3733 opposite last page.

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FLARING
TOOLS



Don't take our word for it — try a new **RIGID** Flaring Tool! See if you don't get smoother, stronger, more uniform flares . . . in less time and with less effort than ever before!

Then, compare this new **RIGID** Flaring Tool, feature-by-feature, with any flaring tool you've ever seen or owned:

- Feed releases automatically when flare is fully formed.
- Reversing feed screw burnishes flare.
- Hardened steel die bars are precision-machined.
- Large, comfort-grip feed

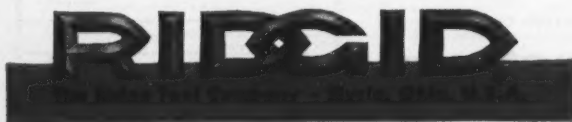
screw handle turns easily.

- Precision-ground, hardened steel flaring cone, eccentrically mounted in precision bearings, produces rolling action for even metal flow . . . gives uniform flare walls without galling.
- Tubing hole sizes are clearly marked.
- Easy sliding rugged malleable yoke serves as stop for tubing to give correct flare size.
- Yoke clamp screw fits into centering hole . . . locks bars, yoke and tubing into perfect alignment.
- Stop pins keep yoke on die bars at all times . . . yoke can't slide off.

3 MODELS:

RIGID No. 457 for 45° flares, 1/8" to 3/8" O.D. (7 sizes)
RIGID No. 459 for 45° flares, 1/4" to 3/4" O.D. (9 sizes)
RIGID No. 376 for 37° flares, 3/16" to 3/8" O.D. (6 sizes)

See and try these new **RIGID** Flaring Tools.
 Your Supply House has them.



Check 3734 opposite last page.

Foreign Competition

From preceding page

tant," says Stauffer's International Division head Fred W. MacMullen, "but as far as heavy chemicals are concerned, we over here have cheaper power, cheaper raw materials and can, therefore, in many cases produce as economically as the Europeans." A sales executive commented, "In agricultural chemicals, I'm convinced we could take the Latin American market away from the Europeans, if we really wanted to."

Cost of building plants abroad has come in for a good deal of comparison. For some time, evidence seemed to indicate that the Germans could build plants for less than over here. Comparison of actual costs and factors on exactly similar accounting bases has shown that the Germans might have a 10 to 15% advantage, but no more.

U.S. Policy Handicaps Private Firms

Government administration of the foreign aid program, in the opinion of some U.S. businessmen, could be directed to give private industry a better chance to show what it can do. They cite several factors as tending to increase rather than decrease the difficulty of operating abroad.

Foreign aid . . . currently running \$4 billion, all told . . . includes funds available for plant construction that "would be far better left to private enterprise" to develop with the countries involved, says E. G. Hesse, managing director of Cyanamid International. "Not only is the aid money simply handed to the recipients, but often it is for the purpose of setting up operations which will be unwisely competitive with established or planned activities of private enterprise."

"If our government would," continues Mr. Hesse, "allow our chemical industry just the advantage of paying U.S. tax on its foreign earnings when it takes the money out of the country instead of annually, this would provide an incentive that would justify private undertaking of a number of the kind of projects now cov-

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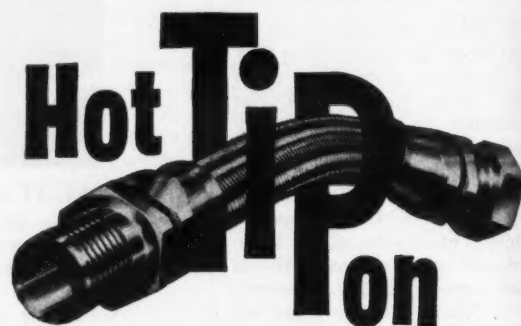
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Check 3735 opposite last page.



FLUID LINE PROBLEMS

AEROQUIP Flexible Hose of Teflon

and Reusable "super gem" Fittings*

Even under high pressure, constant flexing and temperatures from -65° to 450°F., users report long life for Aeroquip Hose of Teflon and "super gem" Reusable Fittings—chemically inert, excellent lubricity, ideal for chemicals, hot air, solvents and steam. Get bulletin IEB-50—or see "Yellow Pages" under "Hose" for your Aeroquip Distributor.

*U.S. Patent Nos. 2,839,567 and 2,781,278
 "super gem" is an Aeroquip Trademark
 Teflon is DuPont's trade name for its tetrafluoroethylene resin

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Check 3736 opposite last page.

CHEMICAL PROCESSING

ered by the vast sums of the foreign aid bill. Besides creating local employment and paying local taxes, we could save the American taxpayer a good deal of money."

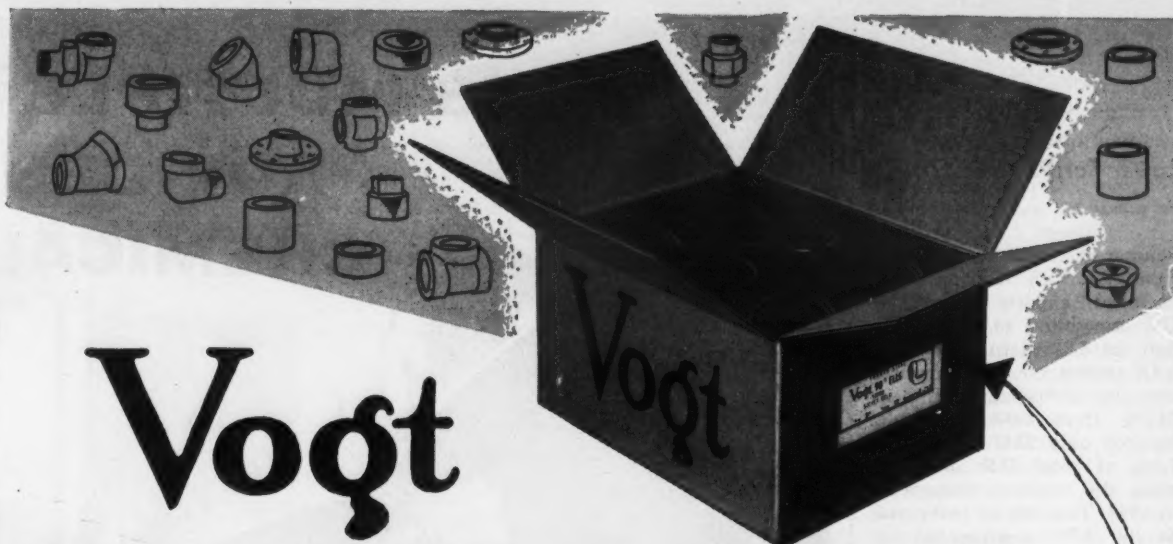
An engineer-constructor comments about our policies, "personal income taxes are now such as to remove the incentive for a career abroad."

Perhaps the most exasperating thing a company desiring to do business abroad can run into is disinterest on the part of our local embassy and consular officials in the practical day-to-day aspects of doing business and living in the underdeveloped countries. "We were recently told by the officials of one of our embassies that they couldn't supply information as to how our personnel could get drivers' licenses, inasmuch as this was a problem not ordinarily experienced by personnel having diplomatic immunity," reports one source.

"Our commercial attaches seem to be more interested in statistics than how to help us find our way around," comments another. In some countries ambassadors are known to help bring parties together to negotiate sale of plants or setting up joint ventures. Apparently this is not a type of service made available by our State Department personnel abroad.

Although these might seem like petty complaints, they are related as part of a framework which adds up to: Our competitors are getting all sorts of help from their governments. We don't. Whether our private industry can continue to accomplish desired expansion of both export business and setting up manufacturing ventures abroad under such lack of aid or encouragement is a serious problem.

Many chemical businessmen appear to feel that sooner or later, our American chemical industry will need some kind of alliance with our government to meet future overseas problems — particularly when Soviet production begins to be felt! Being businessmen, they fear government encroachment, but they are also realists in a world growing tougher.



Voigt PACKAGED

**FORGED STEEL
FITTINGS, FLANGES
and UNIONS**



Complete product identification and data on label attached to carton.



Voigt modular designed cartons give added handling and storage space economies. All dimensions are in multiples of 3 inches.



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**MATERIAL
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Handling and inventory costs are held to a minimum with Voigt modular packaged forged steel fittings, flanges, and unions. The small cartons, of restricted weight, are appreciated by the distributor and user alike for their easy handling and the protection given the products against damage.

The label attached to each carton completely describes and pictures the product and gives the quantity, size, end type, pressure, and catalog number.

Write for Folder PF-1 for complete data on quantities and weights of the items as packaged in various sizes of cartons.

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HENRY VOGT MACHINE CO.
P.O. Box 1918 Louisville 1, Ky.

SALES OFFICES New York, Chicago, Cleveland, Dallas, Camden, N.J.,
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Check 3737 opposite last page.

Lower Tariffs Ahead?

From page 27

volume of chemicals exported from the U.S. During 1959, chemical exports from the U.S. amounted to \$1475 million, an 8.9% gain over 1958.

Of course, chemical imports are also increasing, being up 24.2% from 1958. However, total is only \$347 million, or 1.3% of total U.S. chemical sales, the same percentage as in 1952. This can be compared to the 5.3% represented by chemical exports from the U.S.

Obviously more and more people are thinking it is better to protect that 5.3% and increase it rather than worrying so much about the 1.3%. It is true, however, that cases of hardship would result from sharp cuts on certain items.

Export Sales Up

A look at the annual reports of chemical companies shows export sales up. For example, Hercules is running about 14% foreign sales. Certainly many people at a company such as this must be thinking more about foreign business than when export sales were much lower.

In fact, Hercules recently formed an international division. American Cyanamid consolidated its international operations into one department. Other companies have made similar moves.

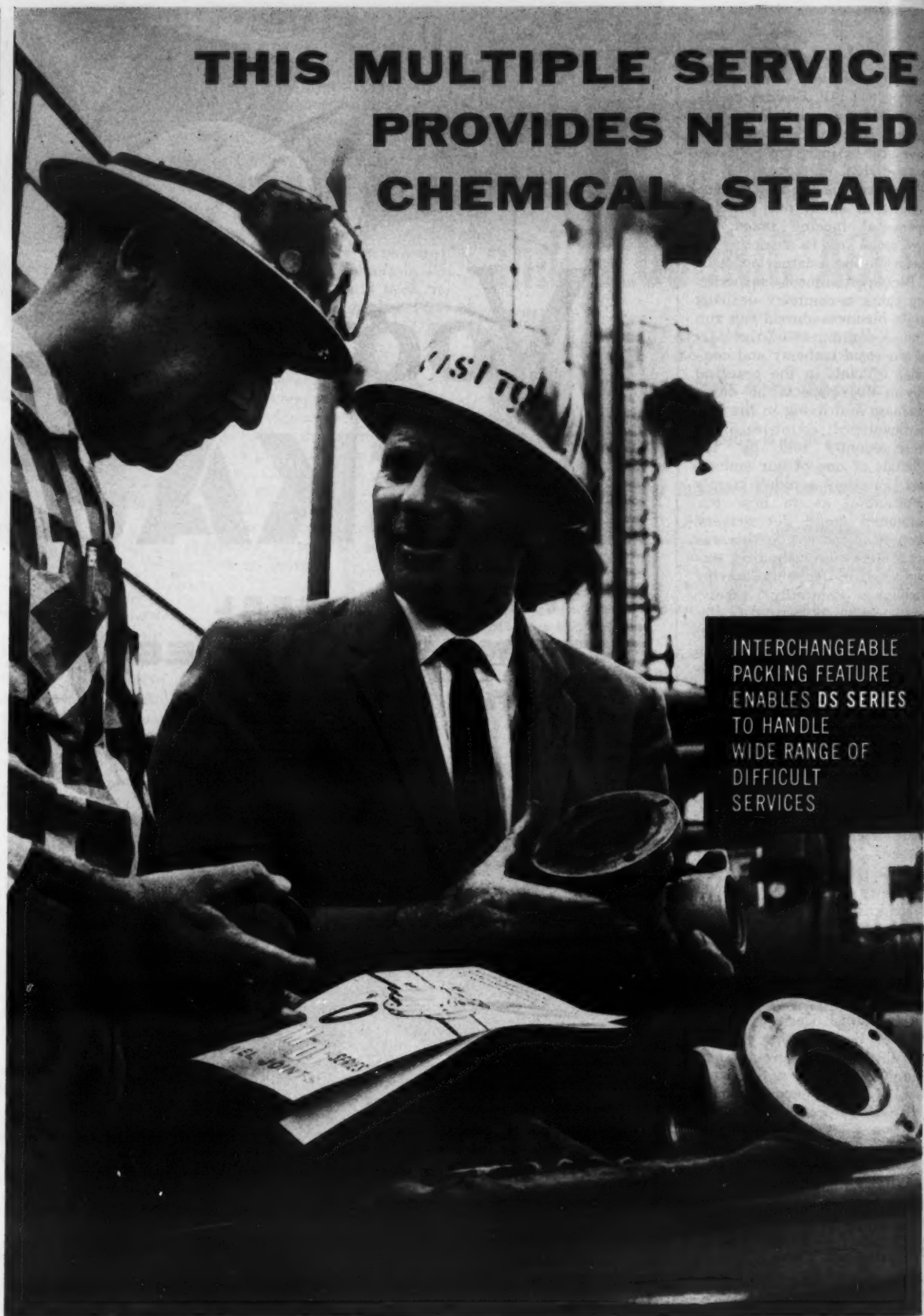
S. C. Moody, director-general of Cyanamid International, reports that Cyanamid's foreign business consists of 60% chemicals exports from the U.S. and 40% from Cyanamid's foreign plants. Although he believes this ratio will reverse itself over the next few years, the total volume of Cyanamid chemicals made in the U.S. and exported will continue to increase.

Chemical Companies Must Go Global

In order to maintain their profits and increase them, U.S. chemical companies must think international. H. E. Hum-

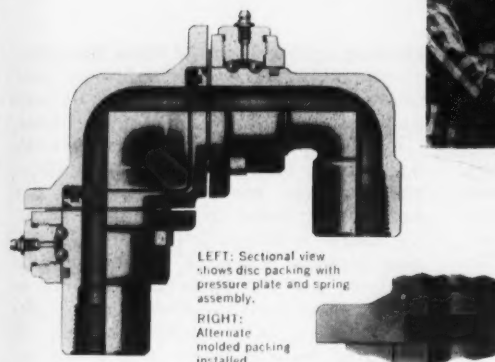
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INTERCHANGEABLE
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CHIKSAN SWIVEL JOINT

FLEXIBILITY IN ALMOST ANY OR HOT GAS SERVICE



LEFT: Sectional view shows disc packing with pressure plate and spring assembly.
RIGHT: Alternate molded packing installed.

THE TABLE BELOW IS A QUICK GENERAL REFERENCE FOR THE CORRECT PACKING FOR SPECIFIC SERVICES:

PACKING	SERVICE	TYPE
Neoprene	Recommended for alkaline and acid salt solutions and aldehydes such as formaldehyde.	Molded
Hycar	These should be used for petroleum derivatives, neutral or slightly acidic salt solutions, dilute acids (Sulfuric to 50%, Hydrochloric and Nitric to 20%), alcohols, glycols, ethers, gases (Oxygen not over 500 psi), and vegetable oils.	Molded
Butyl	Recommended for liquid or anhydrous ammonia, gases (except oxygen over 500 psi), ammonia derivatives such as hydrazine and for certain hydraulic fluids such as Pydraul, Skydrol, and Cellulube. It is recommended for acetone and methyl ethyl ketone.	Molded
Teflon	For highly oxidizing fluids, esters, and ketones, and other fluids not handled by elastomers.	Disc
Asbestos	For use in saturated steam service.	Disc
Viton "A" (BBB)	For high temperature fluids, aromatics, liquid chlorine and other halogens, tetra ethyl lead, chlorinated hydrocarbons such as carbon disulfide, molten sulfur, etc. Do not use for esters or ketones. This compound should give good service to 400°F.	Molded
Viton "A" (DDD)	Recommended for strong acids such as concentrated sulfuric, red fuming nitric, and hydrochloric. This compound should give good service to 350°F. Do not use for esters or ketones.	Molded
Metallic	For extreme services such as hot gas at 600°F., a Stainless Steel metal disc, specially treated to prevent galling, is recommended.	Disc

* BBB and DDD are Chiksan compound identification letters.

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Check 3738 opposite last page.

You'll find a good answer

to fluid line flexibility problems in the new Chiksan DS Swivel Joint. This versatile new joint offers maximum safety, complete flexibility and reduction of maintenance costs. Designed to use either disc or molded type packings, the DS Swivel Joint now permits packing changes in the line without removal of ball bearings.

You reduce your inventory

requirements because the same joint, with a change of packing, can be quickly adapted to any number of chemical, steam, or hot gas services in your plant. In large installations, substantial savings may be realized by reducing the inventory of joints.

Reduced maintenance costs...

Chiksan DS Swivel Joints require only routine lubrication to assure long service life. To save maintenance down-time repacking can often be done in the line. General servicing can be handled by regular shop maintenance personnel.

Let Chiksan help you

plan your installation design. Whether your need is for a chemical loading rack, for stress relief lines, for lines subject to expansion, settling or torsional stresses, or as a connection between stationary and rotating equipment, Chiksan field representatives are ready and qualified to render immediate technical assistance. For more information on these multiple service swivel joints, write to Chiksan or fill in the coupon below.



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#40-52

phreys, Jr., board chairman and chief executive officer of the U.S. Rubber Co., summed it up well when he spoke at a recent MCA meeting:

He emphasized that American corporations must 'go global' if they are to continue to thrive. As regards tariffs, Mr. Humphreys feels, that like many other companies, he must fight tariff reductions — at least right now.

"But," he continues, "if one takes a realistic long-term view, one realizes that high protective tariffs have no permanent place in free world markets. Therefore, our plans must be based less and less on protection and more and more on the self-reliance of higher productivity."

U.S. Government Is Driving for Exports

The U.S. Department of Commerce is conducting an active drive for exports and wants to assist companies striving to export more in every way possible. The primary reason for this is to stop the gold drain which was \$3.7 billion in 1959. This is mainly due to foreign aid. Actually, exports run considerably higher than imports. For example, it is predicted that U.S. exports will be \$19 billion in 1960 and imports \$15.5 billion, leaving a \$3.5 billion export surplus. This may cut the deficit in the overall balance-of-payments this year.

Many U.S. companies are particularly interested in selling more to both Western Europe and Japan, which represent booming markets. U.S. exports in 1959 were up about 15-20% to both Western Europe and Japan.

NEXT MONTH

Some thought-provoking questions have been raised by the mushrooming interest of businessmen in politics. How leading executives feel about these will be presented in a survey article next month.



As **SIMPLE** and
Dependable
as the Pull of a
MAGNET!

A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

MAGNETROL

The Simplest, Most Versatile
LIQUID LEVEL CONTROL
Ever Devised!

Linked to liquid level by infallible magnetic force, Magnetrol is free from the limitations inherent in mechanical or electrical controls. With the actuating magnet rated at 98% of initial strength after 30 years, Magnetrol has *infinite operating life*, with practically no maintenance at all. There are no wearing parts to get out of order.

What's more, Magnetrol's simple operating principle permits easy, economical modification of standard units to meet *any* pressure, temperature or corrosion requirements. That's why there's practically no limit to Magnetrol's use. It's also why "specials" are likely to be standard with us. Magnetrol units control level changes from .0025-in. to 150-ft.—with single or multi-stage switching.

MAGNETROL, Inc.

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MAGNETROL, Inc. 2129 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on
Magnetrol Liquid Level Control.

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Company _____
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cp PROCESS INSTRUMENTATION
and LABORATORY APPARATUS

IR Analysis —

Big equalizer for 'little guy' in epoxy-resin formulation

DR. HENRY L. LEE

Vice President and Technical Director
The Epoxylite Corporation
El Monte, Calif.

WITH availability of infrared-analysis methods, small specialty companies need not take a back seat to major firms. Experiences in epoxy-resin formulation at Epoxylite Corporation have borne out this thesis.

An IR spectrophotometer is the central element of our research and product-development work. It is an equally valuable tool for quality control, production and market analysis. All told we have found nine general areas of useful application for infrared techniques:

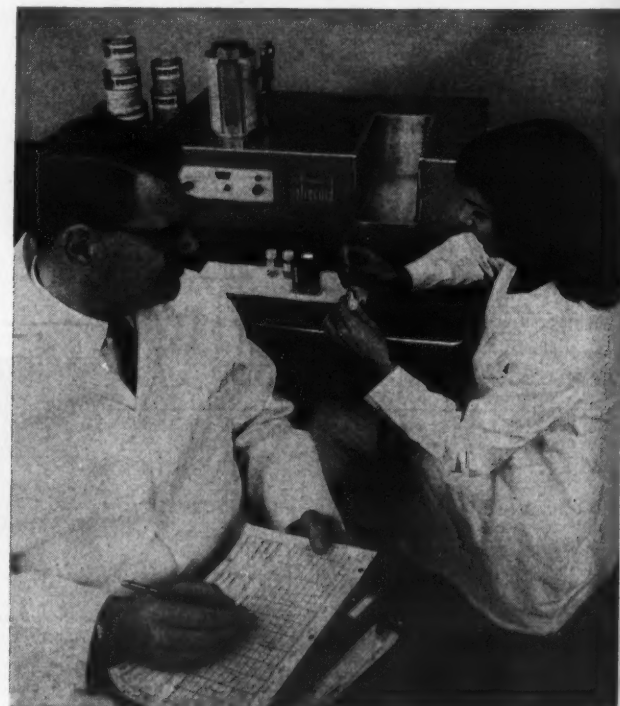
1) Product analysis of correlations between molecular structure or general chemical composition and physical and chemical characteristics.

2) Study of reaction mechanisms, by

running repeated tests of same sample as curing occurs. These have always been time-consuming and expensive. IR puts such studies within reach of smaller firms.

Case in point: We had a new curing agent under study for a coating application. It gave room-temp gels in two hours. We wanted to find out cure time necessary to obtain full chemical-resistance potential of coating. Without infrared analysis, series of chemical-resistance or wet-analysis tests on number of samples would have been necessary. With IR spectrophotometer, same sample was run every few hours the first day—and then daily for one week until epoxy groups disappeared.

3) Quality control of incoming raw materials is very important in our operations. In the past, smaller concerns could not afford to quality-control small lots or single drums. They were completely at the mercy of the large supplier. Fast-



Dr. Lee studies spectrum chart made with Epoxylite's infrared spectrophotometer, while his assistant prepares another sample for analysis

Check 3739 opposite last page.

"Infrared analysis of competitive products, in combination with their technical literature and price lists, reveals their raw-material costs and mark-ups . . . Trade secrets are a vanishing factor in this business."

Nine IR Pluses for Epoxylite

- | | |
|--------------------------------------|-------------------------------|
| + Product Analysis | + Raw-material Identification |
| + Study of Reaction Mechanisms | + Survey of Competition |
| + Quality Control of Raw Materials | + Market Surveys |
| + Quality Control of Production Runs | + Customer Service |
| | + Testing Purchased Plastics |

scan features of IR instruments have changed all this.

One example of benefits to us of such quality control involved a substituted imidazoline. This was being purchased as a wetting agent for use in adhesive formulations.

One shipment was received which had heavier compound separated out at bottom of drum. IR analysis revealed high percentage of amide, rather than an imidazoline. Deviation in supplier's normal reaction conditions had caused change.

Conventional wet analysis on the part of supplier had failed to reveal this difference. Interestingly enough, physical tests of epoxy made with the "off" batch showed it to be superior as a wetting agent. Future orders to supplier specified that type batch.

4) **Quality control of production runs** is of major importance to epoxy-resin formulators if they are to supply to concerns for encapsulation. Often, electrical or electronic items, containing several thousand dollars worth of temperature-sensitive germanium diodes, involved circuits and/or windings, will be encapsulated in four or five dollars worth of epoxy.

If resin quality is not controlled, high exotherm and shrinkage rates may damage heat-sensitive components, strip enamel off wire, cause short circuits, or crack open and render entire unit worthless except for salvage.

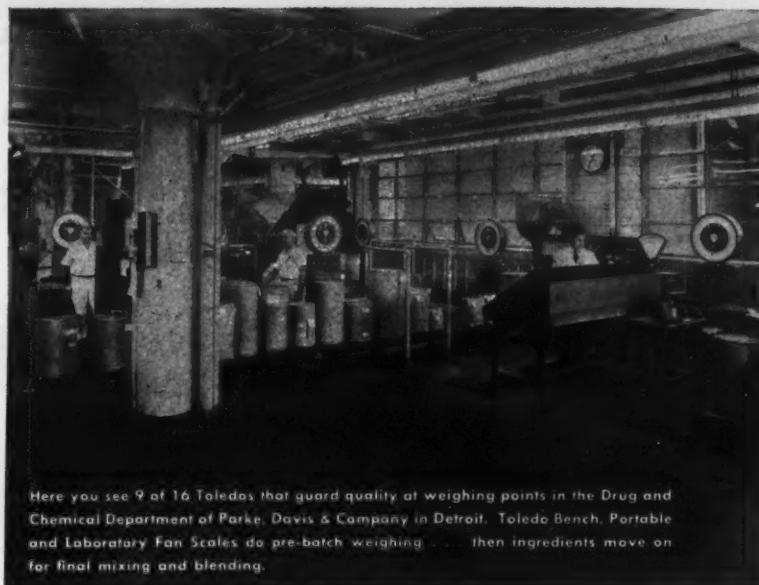
One good example of manufacturing quality control via IR involves amides. These are fast becoming popular epoxy-resin agents. Infrared provides quickest quality analysis we know.

Manufacturing problem revolves about determination of exact temperature (approximately 450°F) and holding time for given size batch in given reactor kettle, so as to drive acid-amine salt over to amide. Large difference between spectrum of acid-amine salt and that of amide makes spectra interpretation quite fast.

5) **Raw-material identification.** Knowledge of structure and composition of raw materials offered under non-descriptive proprietary names or numbers is valuable. Such information is vital to evaluation and profitable use of these materials.

6) **Survey of competition.** IR analysis of competitive products, in combination with

To page 82



Here you see 9 of 16 Toledos that guard quality at weighing points in the Drug and Chemical Department of Parke, Davis & Company in Detroit. Toledo Bench, Portable and Laboratory Fan Scales do pre-batch weighing . . . then ingredients move on for final mixing and blending.

TOLEDO SCALES

**meet PARKE, DAVIS & COMPANY'S
Critical Standards . . .**

Parke, Davis & Company brings to doctors and patients wonders in the world of medicine . . . products that help extend the span of human life . . . alleviate suffering . . . and thwart sickness and disease. It's a 94-year tradition at Parke, Davis & Company to keep going forward — in research and in methods and equipment used in their laboratories.

You'll see evidence of this company's progress in the choice of modern Toledos for fast, accurate control at weighing points. Putting Toledos in these vital jobs of weight-control assures that right amounts of drugs and chemicals go into each carefully determined formula — every time!

Let us show you how modern Toledos will fit your needs equally well — whatever your weighing problem. Write today for new Condensed Catalog 2001.



● Toledo Model 2282 Suspended Platform Scale weighs drug materials going into batches in the Crude Drug Milling Section of the Extract Department.

TOLEDO SCALE, TOLEDO 12, OHIO
Division of TOLEDO SCALE CORPORATION
(Toledo Scale Company of Canada, Ltd., Windsor, Ont.)



TOLEDO

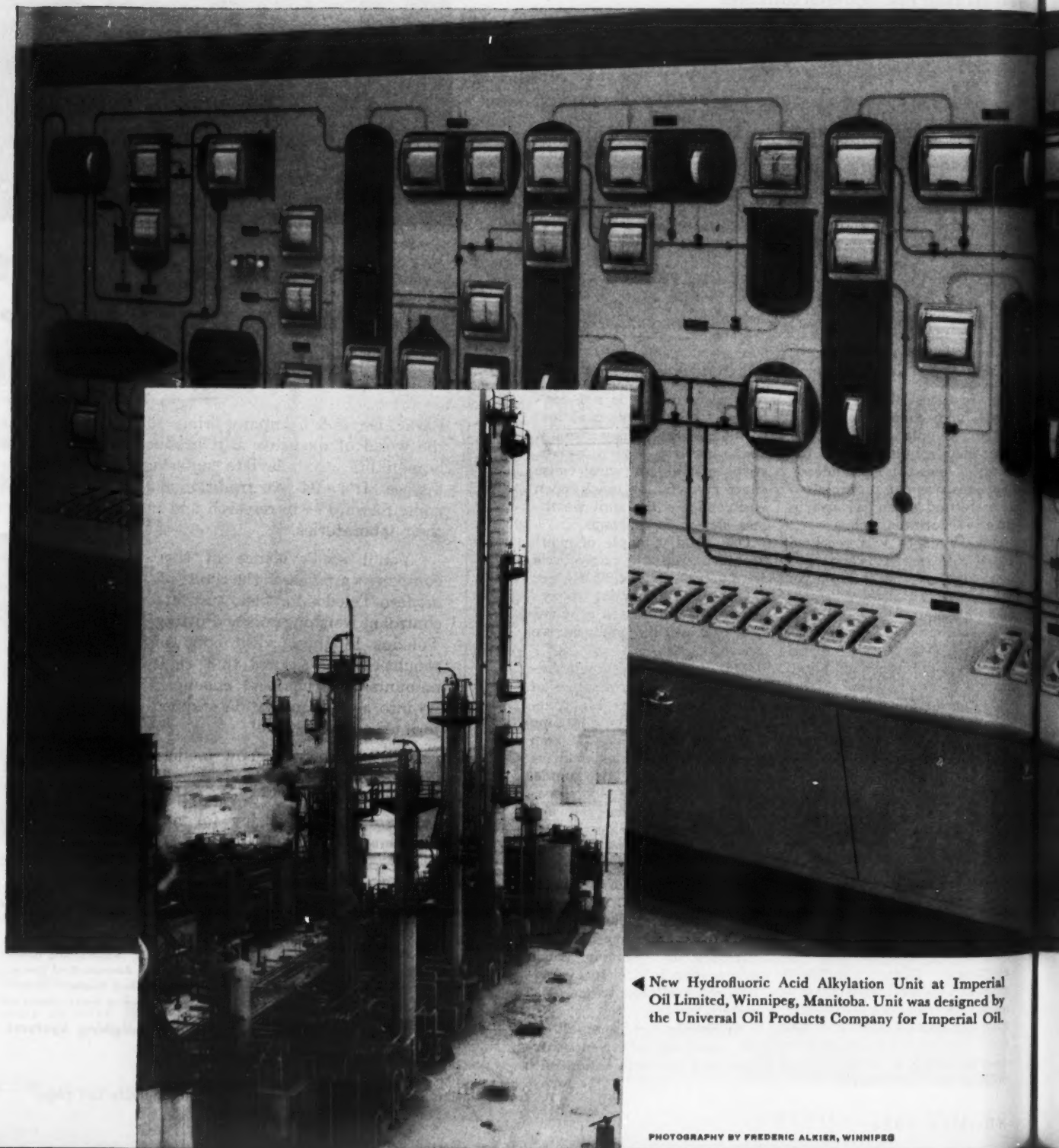
Headquarters for Weighing Systems

Weight-printing Scales • Motor Truck Scales •
Automatic Batch Controls • Bulk Weighers • Automatic
Check Weighers • Electronic Load Cell Scales •
Counting Scales • Mailing and Parcel Post Scales

Check 3740 opposite last page.

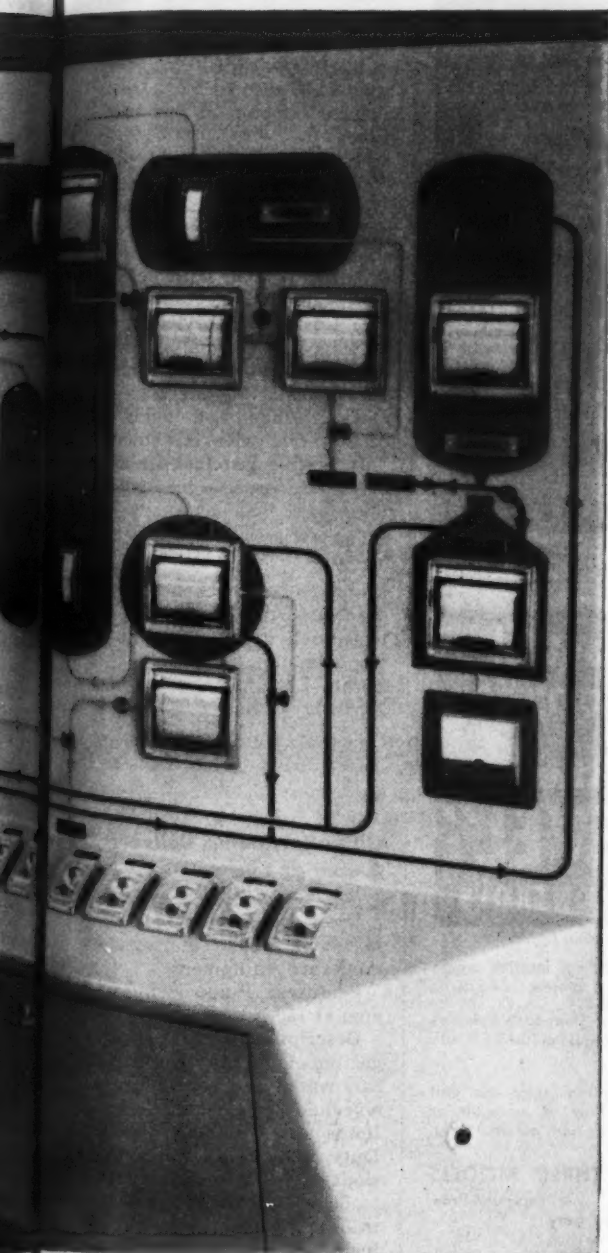
at Imperial Oil Limited

They wanted a low
they chose Foxboro



◀ New Hydrofluoric Acid Alkylation Unit at Imperial Oil Limited, Winnipeg, Manitoba. Unit was designed by the Universal Oil Products Company for Imperial Oil.

w maintenance electronic system... o Electronic Consotrol instrumentation



problems of "frozen" air and vacuum tubes eliminated in new HF Alkylation Unit at Winnipeg, Manitoba

There were significant reasons for installing Foxboro Electronic Consotrol* Instrumentation on Imperial Oil's new HF Alkylation Unit in Winnipeg, Manitoba.

First — Foxboro electronics completely eliminated their problem of air supply — particularly vexing in a climate where the temperature drops below freezing 9 months out of the year.

And second — they like Foxboro's "all solid state" feature, because they'll never have an instrument failure due to a burned out vacuum tube.

Imperial Oil also appreciates the compactness of Foxboro electronic control panels. Compact 3" x 6" controllers are located on sloping panel console — 4-inch strip chart recorders are integrally-mounted in graphic diagram. With a minimum of searching, the operator knows how the process stands.

If speed of response, sensitivity, and reliability play an important role in your process, it will pay you to investigate Foxboro Electronic Consotrol instrumentation. Ask your Foxboro Field Engineer about it. Or write for Bulletin 21-10. The Foxboro Company, 818 Neponset Avenue, Foxboro, Massachusetts.

*Reg. U. S. Pat. Off.

▲ **FOXBORO ELECTRONIC CONSOTROL PANEL** at Imperial Oil includes 32 control loops. 3" x 6" Control Stations are so compact they are mounted on panel console, while recorders are mounted directly in the graphic diagram above.

FOXBORO

REG. U. S. PAT. OFF.

Check 3741 opposite last page.

Ideal for Laboratory DURABLE WESTON TESTING THERMOMETERS OFFER

±0.5% ACCURACY OVER ENTIRE RANGE

Weston Model 2261 Testing Thermometers are well suited for laboratory and other applications where a combination of the ultimate in precision and long-term dependability are needed. These Bi-Metal thermometers provide:

High accuracy. ± 0.5% full scale. Unaffected by over- and under-temperatures up to 50% of range.

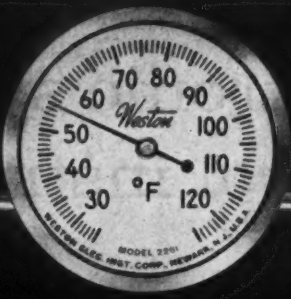
Ease of reading. 1.75" diameter head, widely-spaced scale markings on 3.4" long scale. Metal plate has permanent black figures and markings.

Rugged construction. Exclusive Weston helical sensitive element offers exceptional structural stability and fast, dependable thermal response.

Corrosion resistance. Except for glass windows, these thermometers are completely encased in stainless steel. Supplied with special coating material where increased corrosion resistance is needed. Also available with clear, unbreakable plastic windows.

Choice of ranges and stems. 16 ranges are provided (see box at right). Standard stem is 8" long... other lengths up to 18" may be obtained.

Call your local Weston Distributor for full details, or write: Weston Instruments Division, Daystrom, Inc., Newark 12, New Jersey. International Sales Division, 100 Empire St., Newark 12, N. J. In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ontario.



Actual size

Model 2261 Testing Thermometers are supplied in the following ranges:

RANGE	/DIV.	RANGE	/DIV.	RANGE	/DIV.
-100 to 100 F	2	50 to 300 F	2	10 to 110 C	2
25 to 125 F	1	50 to 400 F	5	0 to 100 C	1
-40 to 160 F	2	50 to 500 F	5	0 to 150 C	2
0 to 180 F	2			0 to 250 C	2
		100 to 40 C	2		
0 to 220 F	2	0 to 50 C	1/2		
50 to 250 F	2	-50 to 100 C	2		

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION

Weston for Dependable Accuracy

Check 3742 opposite last page.

MEASURE CO DIRECTLY

WITH THE
MONOXOR®
CARBON MONOXIDE INDICATOR



THIS REMARKABLY SIMPLIFIED INSTRUMENT INDICATES CARBON MONOXIDE PERCENT IN THE AIR SAMPLE TESTED BY MEASUREMENT OF CO-STAIN IN THE INDICATING TUBE.

Range:
10 to 2000 PARTS CO per MILLION PARTS of AIR (0.001% to 0.2% CARBON MONOXIDE)

- Requires no color matching — is independent of operator's color perceptiveness.
- Accurate and dependable over wide range of lighting conditions.
- Not affected by presence of other gases normally encountered in safety testing (nitrous oxide, sulphur dioxide, methane, etc.)

SAMPLER CDE
INDICATING TUBE CC-333

M-31

For complete particulars, send for Leaflet 890A

BACHARACH INDUSTRIAL INSTRUMENT CO., 200 N. BRADDOCK AVE., PITTSBURGH 8, PA.
Send me a copy of MONOXOR CO Indicator LEAFLET 890A

NAME _____ POSITION _____
COMPANY _____
STREET _____
CITY AND STATE _____

Check 3743 opposite last page.

Positive bin level control— no overflows...no empties

with
STEPHENS-ADAMSON
"TELLEVE"
BIN-LEVEL CONTROLS



- Explosion-Proof Model for location where combustible materials present hazards.
- Pendant float-ball or float-cone operates sensitive switch to regulate level of bulk materials.
- Installed at various bin levels, the unit will start or stop flow of materials or operate signal light or horn automatically.

AVAILABLE IN THREE MODELS

- Normal Duty
- Explosion-Proof
- Heavy Duty



WRITE FOR BULLETIN 159

**STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.**
11 RIDGEWAY AVENUE • AURORA, ILLINOIS
PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA
CLARKSDALE, MISSISSIPPI • BELLEVILLE, ONTARIO

Check 3744 opposite last page.

INSTRUMENTS & LAB

Infrared Analysis

From page 79

their technical literature and price lists, reveals their raw-material costs and mark-ups.

Published test and application data may be directly interpreted in terms of product's formulation, thus saving IR user from extensive testing to learn what his competitor knows. Trade secrets are a vanishing factor in this business.

7) Market surveys of proposed new area of operation can be aided by obtaining information on current technologies and marketing practices in the field with help of IR techniques.

8) Customer service — involving simple analysis with the infrared spectrophotometer — enhances supplier's technical prestige and tends to cement ties with customer.

9) Testing purchased plastic materials for use in applications such as packaging is expedited with aid of IR analyzer.

(Infrared spectrophotometer used by The Epoxylite Corporation is the Infracord Spectrophotometer, a product of Perkin-Elmer Corporation, Norwalk, Conn.)

Check 3745 opposite last page.

Lilliputian pump delivers 8 gpm at 150 psi

Uses: Heavy-duty pumping service in areas requiring subminiature equipment.

Features: Pump delivers 8 gpm at 150 psi.

Description: Small centrifugal impeller pump can handle salt water and certain corrosive fluids. Normal temperature limits are -60 to +350°F. Duty limit is 10 min. Pump shaft seal withstands pressures to 600 psi. Principal materials utilized in pump construction include aluminum housing and bronze impeller.

(Centrifugal impeller pump is product of Hydrodyne Corporation, 7350 Coldwater Canyon Ave., N. Hollywood, Calif.)

Check 3746 opposite last page.

U.S.I. CHEMICAL NEWS

★

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

★

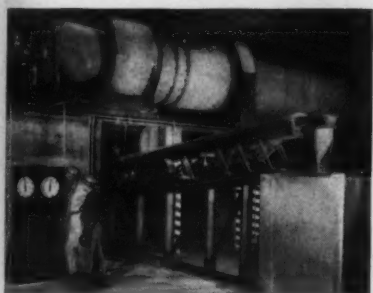
60% Interest in Mallory-Sharon Metals Acquired By National Distillers

New Name—Reactive Metals, Inc.

National Distillers, formerly one-third owner of Mallory-Sharon Metals Corporation, has recently acquired a 60% interest in the company. The operations of Mallory-Sharon Metals are being integrated with those of its now 100%-owned subsidiary, Johnston & Funk Metallurgical Corp., and the combined company is to be known as Reactive Metals, Inc. Sharon Steel Corp. owns 40% interest in Reactive Metals.

This reorganization will make Reactive Metals one of the world's largest producers of special metals such as zirconium and titanium sponge and mill products, and columbium, hafnium, molybde-

MORE



Zirconium oxide kiln in chemical processing section of Reactive Metals zirconium sponge plant at Ashtabula, Ohio.

Corrosion Costs Slashed by Large-Scale Titanium Use

Two ore processing units, completed in the past year, are the first Chemical Process Industry installations to make extensive use of titanium equipment in highly corrosive service. The decision to use titanium was based on 15 months of pilot plant studies in which the higher-priced metal proved most economical in terms of equipment life expectancy.

Titanium was tested against stainless steels, Hastalloys, Monel, other alloys and nonmetals, for leaching reactors and piping to handle mixed ore and 10% sulfuric acid and for oxidation autoclaves and piping subject to dilute acid, all at high temperatures and pressures. Titanium showed almost no corrosion, came out first among all the materials tested.

As a result of these

MORE

Production of Nonfood Aerosol Units Estimated at 575 Million In 1959, C.S.M.A. Reports

1959 Figure Represents 22% Increase Over 1958. Hair Sprays Lead for Forth Year, but the Figure Is Down From 1958

On May 18, at the annual meeting of the Chemical Specialties Manufacturers Association in Chicago, it was revealed that an estimated 575 million nonfood aerosol units were produced in 1959. This represents a growth of 22% over 1958, when 470 million units were estimated. The retail value of these units in 1959 was about $\frac{3}{4}$ of a billion dollars.

Methionine Needs Reported Higher in Men Over Sixty

In a study reported recently, methionine requirements of men over 60 were determined by the nitrogen balance technique. It was discovered that they needed from 2.4 to 3.0 grams of methionine per day—more than twice the amount of 1.1 grams reported necessary for young men.

Nitrogen equilibrium was established for a group of men over sixty fed a diet of ordinary food with known nitrogen content. With the information thus obtained, a semi-synthetic diet was given them which contained the same amount of total nitrogen. This diet furnished all essential and non-essential amino acids in the ratio found in egg protein.

This second diet included three grams of methionine per day. The methionine level was gradually reduced until a negative nitrogen balance was obtained. Control and test diets were alternated until the methionine needs of the men were determined accurately.

U.S.I. Announces Booklet On Polyethylene Printing

"Printing of Polyethylene" is the title of a new U.S.I. booklet now available. It's the latest addition to special U.S.I. literature designed to help achieve finest results with polyethylene film.

The new booklet discusses methods of film treatment, printing techniques, printing inks and field test procedures. It also contains a glossary of commonly-used ink and printing terms.

A copy of the 16-page booklet can be obtained by writing to the Technical Literature Department, U.S.I. Chemical News, 99 Park Avenue, New York 16, New York.

The CSMA figure is based on reports from container and valve makers and on responses from 58% (115 out of 198) of the known aerosol fillers—adjusted to account for nonreporting fillers. The actual number of units reported for the year was 498 million.

How the Major Products Ranked

For the fourth year now, hair sprays topped the list, and accounted for 16% of the total units reported. Shaving lathers moved up from third to second place to claim 15% of total production. Insect sprays advanced from fourth to third spot with 13%. Room deodorants, formerly second, ranked fourth with 12%. Coatings remained in fifth position with 11%.

NONFOOD AEROSOLS REPORTED IN 1959 COMPARED TO 1958

(figures in millions of units)

Product	1959	1958
Hair Sprays	79.7	92.6
Shaving Lathers	72.6	45.3
Insect Sprays	65.9	42.3
Room Deodorants	59.7	49.8
Coatings	52.6	30.1
Colognes & Perfumes	34.1	13.6
Glass Cleaners	18.5	3.7
Household Products Other than Room Deodorants and Glass Cleaners	59.1	22.2
Personal Products Other than Hair Sprays, Shaves, Colognes & Perfumes	33.5	27.4
Miscellaneous	22.6	14.4
TOTALS	498.3	341.4

It is to be noted that aerosol cologne and perfume production went up from 14 to 34 million reported units in 1959. And that containers under one ounce accounted for 17% of the perfume and cologne units reported for the year. A separate category for Waxes and Polishes was set up under Household Products in 1959, and revealed a total of 12 million

MORE

U.S.I. CHEMICAL NEWS

CONTINUED

Aerosols

units for the year. Also for the first time, a separate figure for Canadian aerosol production was included—a total of 20 million units from eight Canadian producers. These figures are included in the overall survey for continuity purposes.

U.S.I. Products Used in Aerosols

U.S.I. products, ethyl alcohol and polyethylene, are playing an important role in the large and steady growth of the aerosol industry. Anhydrous ethyl alcohol is a vital ingredient in the top-ranking products—hair sprays and room deodorants—and in the growth leaders—perfumes and colognes. It is widely used in other personal products, and in pharmaceuticals now sold in aerosol form. Polyethylene is used for dip tubes and valve parts.

Last year we reported a forecast by one of the largest makers of aerosol containers—that total production of aerosols would reach 555 million units in 1959. It looks as if the prediction wasn't optimistic enough. Let's see what 1960 brings!

CONTINUED

Reactive Metals

num, tantalum, tungsten and vanadium mill products. With total assets of over \$50,000,000, the company plans to continue emphasizing the production of a wide variety of special metals so that it will be in a position to expand its interest in one or all of them as markets develop.

The contract under which Bridgeport Brass Company has been managing Malory-Sharon Metals will be revised to cover Reactive Metals. Executive offices of Reactive Metals will be located at Bridgeport, Conn. Titanium and zirconium sponge division headquarters are at Ashtabula, O.; columbium, molybdenum and tantalum mill products division at Huntsville, Ala.; titanium, zirconium and special steel mill shapes division at Niles, O.

CONTINUED

Titanium

studies, titanium was employed as follows: In leaching reactors, overflow pipes were lined with titanium; reactor draft tubes, nozzle inserts, and pipe lines connecting reactors, slurry heaters, slurry coolers and flash tanks, were made of titanium. In autoclaves, titanium was used for agitator shafts and blades, autoclave nozzles, connecting piping including letdown valves.

To cut costs, engineers made exact calculations of metal thicknesses required, figured sizes and lengths of pipe as precisely as possible, carefully arranged equipment layouts. In design and production, many basic problems of titanium fabrication were successfully solved, and many economic considerations worked through. Other companies in the process industries can now apply the considerable knowledge gained on this project to utilize the vast potentials of titanium as a corrosion-resistant material.

New U.S.I. Ethyl Acetate Data Sheet Now Available

Three grades of ethyl acetate are described in a new technical data bulletin just released by U.S.I. The grades are: commercial 85-88% ester; 95-98% ester; and 99% ester (acetic ether). Data include U.S.I. specifications, properties, shipping information and uses.

Ethyl acetate is the standard fast-evaporating solvent for nitrocellulose. It is used as a solvent to process or produce lacquer, varnish, smokeless powder, photographic film, pharmaceuticals, perfumes, textiles, plastics, coatings, cleaners and many other products. It is also a chemical intermediate for the manufacture of ethyl acetate and ethyl sodium oxalacetate.

For a copy of the new data sheet, contact your nearest U.S.I. sales office or Technical Literature Dept., U.S.I. Chemical News, 99 Park Ave., N. Y. 16, N. Y.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

New compound, said to lower elevated blood cholesterol levels dramatically with virtually no side effects, is now on market. No dietary restrictions necessary. Contains aluminum nicotinate which hydrolyzes in body. **No. 1610**

Benzotrifluoride and its ortho-, meta-, and para-chloro isomers now available on commercial scale. Suggested uses include manufacture of diuretics and tranquilizers, dyestuffs, biocides, dielectric fluids. **No. 1611**

Stabilised formaldehyde solutions now available are said to permit safe storage at temperatures well below previously recommended levels. Minimum for 37% solution (1% methanol) has been reduced from 90 F to 60 F. **No. 1612**

Tritiated L-histidine, new radioactive material for biochemical tracer studies, now available. Since D-form is absent, this pure tritiated L-amino acid is said to eliminate background interference in radioautographs. **No. 1613**

Special circular slide rule for solving atomic fallout problems is being sold. Quickly tells what radiation level will be anytime after an area experiences atomic fallout from atomic bomb or similar nuclear occurrences. **No. 1614**

Pure crystalline xanthopterin now being offered. Said to extend possible application of compound in research on purine and nucleic acid metabolism in normal and neoplastic cells. **No. 1615**

Activated charcoal paint now available can be coated on any surface to give odor adsorptive properties to rooms, containers, fabrics, etc. Can be removed by water scrubbing after decontamination operations, it is claimed. **No. 1616**

For determination of arsenic in parts/billion amounts, stable reagent grade of silver diethyldithiocarbamate has been developed. With arsine, forms soluble red complex whose absorbance is proportional to concentration of arsenic over wide range and is easily measured. **No. 1617**

Two new radioactive carbon compounds, cortisone-4-C¹⁴ and cortisone-4-C¹⁴ acetate, now on market. These anti-inflammatory, anti-allergic, anti-fibroplastic agents are used in adrenal cortical insufficiency studies. **No. 1618**

All existing information on sodium chloride has been compiled for the first time in a new, 732-page monograph now being sold. Brings together all modern data on salt sources, production, properties, uses. **No. 1619**

PRODUCTS OF U.S.I.

Ethyl Alcohol: Pure and all denatured formulas; Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL®M, ANSOL PR

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Oriho-Chloranilide, Acetoacet-Oriho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide.

PETROTHENE®...Polyethylene Resins

MICROTHENE...Finely Divided Polyethylene Resin.

Animal Feed Products: DL-Methionine, MOREA® Premix (to authorized mixer-distributors).

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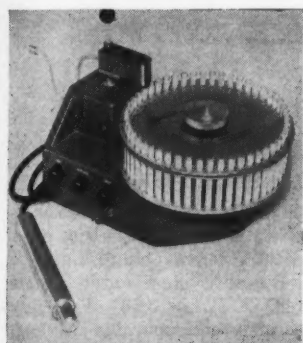
**Gas-fraction collection
of organic components
is quantitative**

Radioactivity is measured
after collection

Uses: Gas-fraction collec-
tion.

Features: Collector permits
quantitative collection of in-
dividual organic components
in gas-chromatographic ef-
fluent stream.

Description: After collection
by gas-fraction collector, pre-
cise measurement of radioac-
tivity in component peaks can



In gas-fraction collector, eight-
inch-diam turntable holds up to
50 cartridges, each packed with
silicone-coated scintillation crys-
tals

be made. In unit, eight-inch-
diam turntable holds up to 50
cartridges. Each cartridge is
packed with silicone-coated
scintillation crystals.

Vapors leaving gas-chrom-
atography mass detector pass
through heated gas-injection
nozzle of collector where they
condense on coated surfaces
of scintillation crystals.

As operator observes be-
ginning and completion of
each peak on mass-detector
trace, he actuates control
switch to change cartridges
in a fraction of a second.

(Tri-carb collector 830 is
product of Packard Instru-
ment Company, Inc., Box 428,
LaGrange, Ill.)

Check 3900 opposite last page.

For more information on prod-
uct at left, specify 3901 . . .
see information request blank
opposite last page.

FOR SAFETY YOU CAN SEE REMEMBER THE "V" FOR VISIBLE BLADES!



• The men who pull the switches will tell you what
can happen when a switch, *believed* to be open
—*isn't*. A lot of things can happen—and every one
of them is bad. Personnel safety is in jeopardy.
Motors can single-phase. Machinery and work can
be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on **Visible Blade**
construction which gives you a road block against
any of those possibilities? Doesn't it make equally
good sense to insist on the safety switch which gives
you that construction—plus a lot of other perform-
ance advantages? Evidently it does, because
*Square D switches have never been out of first
place in more than 50 years!*

They cost no more...why settle for less?

MAIL the coupon for latest Safety Switch Bulletin

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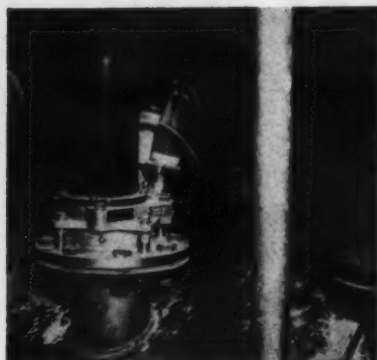


SQUARE D COMPANY

wherever electricity is distributed and controlled

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YES, NOW VISCOSITY



WITH THE

BROOKFIELD VISCOMETRAN

UNDER actual process conditions, the Brookfield Viscometran accurately and continuously measures, records and controls viscosity. Readily mounted and integrated in existing processes, the Viscometran offers significant economic advantages over other methods of indicating degree of reaction, degree of polymerization or determination of process end point.

Viscosity is very likely a variable that is fundamental in your process. For complete information about how the Brookfield Viscometran can provide continuous "in process" measurement of this product dimension for you, write—

THE WORLD'S STANDARD FOR VISCOSITY
MEASUREMENT AND CONTROL



Brookfield

ENGINEERING LABORATORIES, INCORPORATED
STOUGHTON 14, MASSACHUSETTS

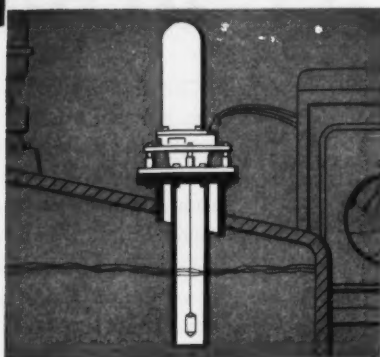
BROOKFIELD VISCOMETRANS NOW SUCCESSFULLY USED FOR CONTROLLING:
Asphalt • Caramel • Cement slurries • Durezresin-acetone slurries • Gluten slurries • Lignum-based polymers • Molten P_2S_5 • Paper coatings • Polystyrene • Polyurethane resins • Ureaformaldehyde resin

Check 3903 opposite last page.



CAN BE CONTINUOUSLY

PROCESS CONTROLLED



INSTRUMENTS & LAB

Tiny laboratory batches sealed-in safely when mixed

Batches of $\frac{1}{2}$ to 2 ounces
are handled in mixer

Uses: Mixing laboratory
batches and material in vol-
umes of $\frac{1}{2}$ to 2 oz.

Features: Thick-wall con-
struction of mixer permits safe
handling of explosives or toxic
and flammable liquids and
solids.

Description: Completely
sealed laboratory mixer han-
dles materials under con-



Laboratory mixer is completely
sealed unit which handles ma-
terials under controlled environ-
ments

trolled environment. Opera-
tion can be observed through
Plexiglas or glass lid. All
parts are machined of pol-
ished stainless steel. Entire
unit can be reassembled for
operation in less than one
minute.

(Micro-mixer is product of
Atlantic Research Corpora-
tion, Alexandria, Va.)

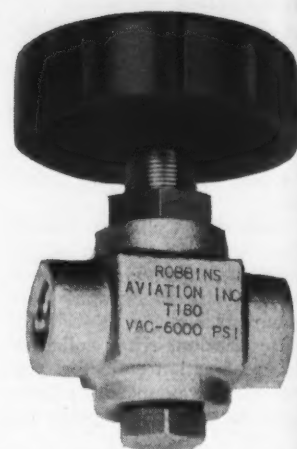
Check 3904 opposite last page.

Triple function for valve which meters at 6000 psi in -65 to +250°F range

Uses: Metering-valve appli-
cations.

Features: Valve may be
used as three-port valve with
two ports in common, globe
valve or angle valve.

Description: Metering valve
is designed for service to 6000
psi. O-ring-type seal plug is
furnished to close off one of



Stainless-steel 6000-psi metering
valve weighs 1.06 lb and has
3.16" diam flow passage

three ports when valve is used
as globe or angle valve. Addi-
tional application is to install
relief valve or burst disc in
third port to provide thermal-
safety or pressure-surge relief
without extra plumbing.

Stainless-steel valve weighs
1.06 lb. It has 3.16" diam flow
passage and operates in range
of -65 to +250°F. It may be
panel-mounted in 30 sec.

(Metering valve T 180 is prod-
uct of Robbins Aviation, Inc.,
2350 E. 38th St., Los Angeles
58, Calif.)

Check 3905 opposite last page.

NEXT MONTH

If your plant converts to a
closed-loop computer-control
system, what impact does this
have on you and your job?
... In instrumenting your op-
erations, have you kept the
safety angle in mind? ... Are
you curious as to what's hold-
ing up practical realization of
the much-talked-about ad-
vances in process-stream an-
alysis? ...

The answers to these questions
are the main components of the
broth we've cooked to order for
you in next month's Sixth An-
nual Process Instrumentation
and Laboratory Apparatus Fea-
ture. This big section will be
seasoned with up-to-the-minute
information on instrumentation
and laboratory applications,
products and literature.

Inaccessible surface temp continuously measured

Uses: Continuous measurement of temperature of remote surfaces.

Features: Unit measures temperatures of surfaces inaccessible to ordinary measurement due to motion, location or possible damage (such as curing or drying of paint, plastic or adhesive films).

Description: Typical area of measurement for radiometer is 1" distance of 30". Area increases roughly with distance. Temperatures from



Radiometer model shown here has manual balance with dial calibrated directly in degrees

120°F upward can be measured; hotter objects lend themselves to use of smaller measuring areas.

(Industrial Radiometer is product of Williamson Development Co., Inc., 317 Main St., West Concord, Mass.)

Check 3906 opposite last page.

Recorder-pH meter duo voids voltage variance

Combination pH meter and strip-chart recorder utilizes electronically modulated amplifier. Amplifier compensates for line-voltage fluctuations and uses standard radio tubes. Strip-chart recorder contains 63' roll of chart paper. It will last for 31 days at 1"/hr.

Pressure-sensitive coating is used on chart paper. pH probe unit provides unitary glass-electrode system completely protected by polyethylene.

(Combination pH meter and strip-chart recorder is depicted in Brochure 3-R—Analytical Measurements, Inc., 585 Main St., Chatham, N.J.)

Check 3907 opposite last page.

AUGUST 1960

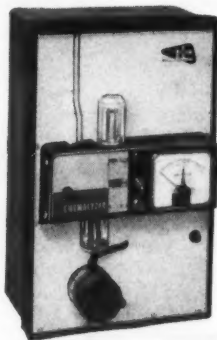
CRITICAL process decisions must often wait hours upon the result of a trip to the laboratory for a wet analysis. But for those determinations that can be performed colorimetrically, continuous, automatic endpoint analysis can now be performed right on the plant floor. New Milton Roy instruments continuously run through every step of a wet analysis in the parts-per-million—even parts-per-billion range without supervision. And any colorimetric analysis that fits these basic requirements can be automated:

1. No more than four reagents required.
2. All interfering ions can be eliminated.
3. No heating, filtering, extracting, or decanting needed.
4. Clean and clear samples and reagents.

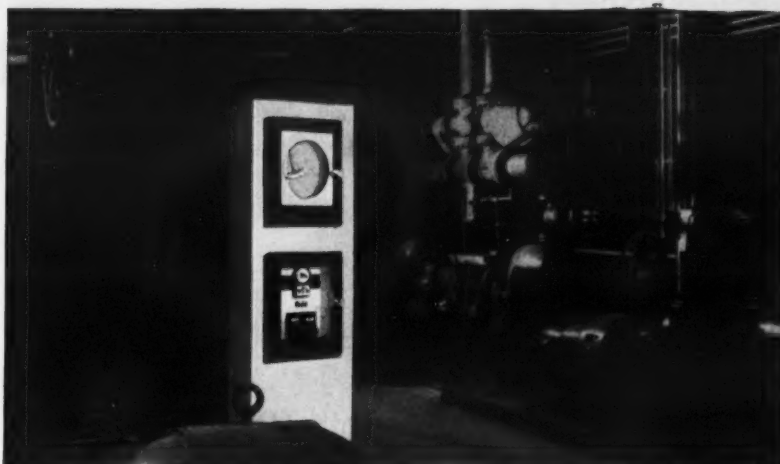
When to use the Quantichem® analyzer

Extremely sensitive Quantichem analyzers measure concentrations in parts-per-billion (ppb) ranges with accuracy approaching $\pm 3\%$ of full scale, and sensitivity of $\pm 1\%$ of full scale. Typical determinations include soluble silica (0-50 ppb), dissolved oxygen (0-30 ppb), copper, soluble iron, hydrazine, and others requiring up to four chemical reagents.

A dual beam optical system and the use of two sample cells (one as a reference cell) eliminate all possibility of errors in measurement due to physical interference with the light path, different phototube aging characteristics, sample turbidity, sample color, and dirt on cell windows.



All the benefits of single-reagent automatic colorimetric analysis are provided by the simple, compact and inexpensive Chemalyzer analyzer. Recording is optional with this unit.

how to choose the right colorimetric analyzer

"A completely automatic quantitative analysis lab" describes Quantichem colorimetric analyzers. The unit illustrated above analyzes silica in parts-per-billion concentration, safeguarding boiler and turbine at a major electric generating utility.

Unique Minus Delta P® metering pumps, housed in the analyzer, meter up to four reagents with accuracies within $\pm 0.25\%$.

Standard designs include a built-in limit alarm and circular or strip chart recorder with single or multiple recorders. As many as eight different samples can be sequenced through a single analyzer, with the analysis of each recorded on an eight-point strip chart recorder. Individually adjustable limit alarms are also available for each of the multiple samples.

Write for Bulletin 1156-1

When to use the Chemalyzer* analyzer

The Chemalyzer unit is designed for simple colorimetric analyses requiring a single reagent, such as water hardness, residual chlorine and phosphates. A simple inexpensive unit, it has no reference cell, and therefore requires samples free of turbidity and discoloration. Though there is no amplification of the measurement signal, concentrations of impurities are detectable to the parts per million range.

One typical application for Chemalyzer instruments is monitoring effluent from zeolite softeners for hardness. At three or six minute intervals (as specified) a fresh sample of effluent is analyzed, and the ppm concentration of hardness is indicated on the face of the instrument. An optional feature is a high limit relay and switch to energize a red light whenever hardness concentration exceeds a pre-set limit. If recording is desired,

*Trademark of Milton Roy Co., Phila., Pa.

Check 3908 opposite last page.

a standard millivoltmeter can be quickly wired to recorder terminals located inside the analyzer cabinet.

The Chemalyzer is compact, easy to operate, and can be installed in minutes. It operates practically maintenance-free. All parts in contact with reagents are made of suitable corrosion resistant materials.

Write for Bulletin 858-1

How to control with Milton Roy analyzers

The high limit switch available in either instrument can be used to initiate control action directly or through relays. Typical functions include starting or stopping a controlled volume pump and starting an automatic regeneration cycle on a zeolite softener. Through the use of a proportional slidewire in the recorder, the Quantichem analyzer can automatically vary the capacity of a controlled volume pump, to increase or decrease the amount of chemical needed by the process.

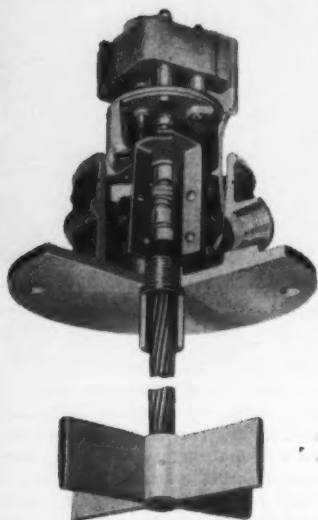
Write for complete data. Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pennsylvania.



Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • pH Instruments

Bulk-bin-level secrets revealed by turning paddle

Two bin-level indicators incorporating flexible shafts have been developed for standard and explosion-proof applications. In operation, bolted-in-



In bin-level indicators, motors turn four-blade paddles

place indicators' 1/100-hp motors turn four-blade paddles by means of torsion spring. Paddle turns continuously so long as no material touches it. Contact turns off motor and any equipment controlled.

(Bin-View level indicators are product of Convair, Pittsburgh 26, Pa.)

Check 3909 opposite last page.

Probe not on surface when sensing temp

Rotating-object thermometer permits measurement of surface temperature without contact of probe with surface. Temperatures of processing rollers and drums can be detected without introduction of errors due to friction.

Thermometer consists of resistance sensing head and battery-operated temperature indicator. In use, probe is positioned about 0.003" away from surface to be measured. Errors normally introduced by

Recorders of the future will have

Powerful Servomatic Motors
in both TRANSCOPE®

Pneumatic and Electronic
Recorders give

unprecedented accuracy
of records . . .

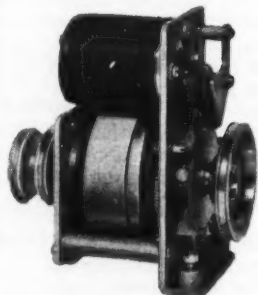
One of the reasons why the 90J (pneumatic) and 700J (electronic) recorders have become the most wanted miniature instruments is this exclusive Taylor feature . . . powerful Servomatic motors that give more precise pen positioning than ever before. Check these benefits:

- Threshold sensitivity of 0.1% to input signal.
- 150 times more power than bellows type used in conventional pneumatic recorders. Over 1,000 times the output power of galvanometer systems in electronic instruments.
- Unprecedented standards of accuracy— $\frac{1}{2}$ of 1% in standard instruments— $\frac{1}{4}$ of 1% optional.
- 3 months' ink supply mounted on the pen—no capillary.
- Integral heavy duty process alarms in recorder cases . . . 2 per servo . . . up to 6 per recorder.
- No flimsy linkages and levers.
- Truly rectilinear chart—no curved time lines.

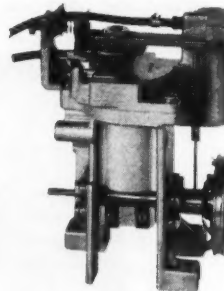
Servomatic motors also allow these optional features: alarm contacts; retransmitting potentiometer; function generation; digital output with encoder discs.

"Hunk of Brass" Test. Ask your Taylor Field Engineer to show you the 'Hunk of Brass' test — conclusive proof of the power of Servomatic motors to assure positive, precise positioning of the pen.

For full details of TRANSCOPE servo operated recorders and their many superior features, write for **Bulletin 98335** (electronic) or **Bulletin 98286** (pneumatic). Taylor Instrument Companies, Rochester, New York, and Toronto, Ontario.



700J (electronic) servo motor is 2 phase, size 15, 60 cycle, 117 volt—built to military specifications. Precision gearing couples the servo to a precise feed-back device with high torque.



90J (pneumatic) servo motor is essentially a power piston with a built-in positioner. Solid construction assures long, trouble-free life.

Taylor Instruments

Servo Power



TRANSCOPE 700J
ELECTRONIC
RECORDER

... Taylor has it **NOW!**

MEAN ACCURACY FIRST

Check 3910 opposite last page.

INSTRUMENTS & LAB



Rotating-object thermometer permits measurement of surface temperatures without actual contact of probe with surface

conduction losses are automatically compensated for by means of built-in parabolic reflector behind element.

Indicating unit is small enough to be held in operator's hand. It indicates temperature directly on calibrated dial and can be used to 450°F.

(Rotating object thermometer is product of Gelman Instrument Company, 106 N. Main St., Chelsea, Mich.)

Check 3911 opposite last page.

NEW LITERATURE

Process Instrumentation
and Laboratory Apparatus

Precise proportional counting of alpha and beta activity in prepared samples is topic of 16-page bulletin which shows systems for such work. Proportional Counting Bul — Nuclear Measurements Corporation.

Check 3912 opposite last page.

High-vacuum systems of glass are detailed in 32-page catalog including drawings of items in line. Glass High-vacuum Systems Cat — Delmar Scientific Laboratories.

Check 3913 opposite last page.

Automatic-data-logger line is reviewed in 12-page Data-Master® Bul — Hanson-Gorrill-Brian, Inc.

Check 3914 opposite last page.

Recording spectrophotometer for measuring colors of materials is considered in 12-page bulletin, including full-page reproduction of typical spectrophotometric curves. Operating principles of unit are explained and diagrammed in detail. Bul GEZ-3031—General Electric Company.

Check 3915 opposite last page.

ACCURATE CHEMICAL FEEDING

from .65 gph to 1624 gph

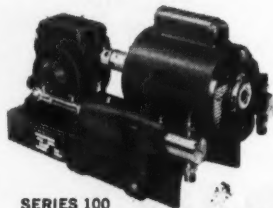
SERIES 200

Self-contained lubricating system—no downtime for lubrication. E.Z. Clean Cart-ridge liquid end simplifies maintenance. Simplex models pump up to 812 gph at a maximum pressure of 10,000 psi. Duplex models double that capacity.



American controlled capacity proportioning pumps have repetitive metering accuracy of plus or minus 1%, when operating between 10% and 100% of capacity. Feed precisely metered fluids or slurries in virtually all ratios, with flow, temperature, pressure, conductivity, pH and other controlled process variables.

- Interchangeable liquid ends
- spherical self-aligning bearings on crank and crosshead handle greater radial and axial thrust loads
- crossheads of hardened and ground steel ride on cast iron
- nylon dust covers protect bearing surfaces
- NEMA frame motors
- heavy duty reducers



SERIES 100

Simplex models pump up to 13.10 gph at a maximum pressure of 1000 psi. Duplex models double that capacity.

AMERICAN
METER COMPANY

INCORPORATED (ESTABLISHED 1934)

pump division

13500 PHILMONT AVE., PHILADELPHIA 16, PENNA.



Check 3916 opposite last page.

INSTRUMENTS & LAB

Computer-control-system development with minimum capital commitment is topic of discussion in 28-page Bul S-4019—Beckman Scientific and Process Instruments Division.

Check 3917 opposite last page.

Gas-analyzer's role in improving operation of three kilns and waste heat boiler is reported in four-page Performance Report G10.1-1—Bailey Meter Company.

Check 3918 opposite last page.

Filter crucibles are depicted in four-page bulletin including porosity-data table. Bul SC-1051—Selas Corporation of America.

Check 3919 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Recording spectrophotometer manufactured by Bausch and Lomb is detailed in 15-page Spectronic 505 Bul—Burrell Corporation.

Check 3920 opposite last page.

Laboratory gas chromatograph, incorporating Golay columns is reviewed in 34-page bulletin which includes reproductions of spectrum charts for various columns. Vapor Fractometer 154-D Bul—Perkin-Elmer Corporation.

Check 3921 opposite last page.

Gages and valves are delineated in four-page Data Unit 363—Jerguson Gage & Valve Company.

Check 3922 opposite last page.

Gas chromatography modular instruments are reviewed and indexed in 60-page catalog which presents 22 modules and 21 other units and accessories. RSCo 600 Series Cat—Research Specialties Co.

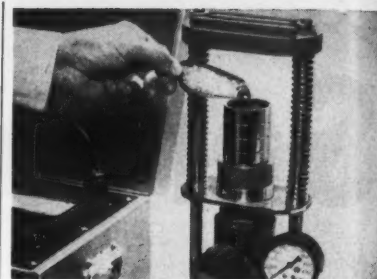
Check 3923 opposite last page.

Thermocouple assemblies of over 100 varieties are pictured and described in detail in 40-page Cat G100-1—Industrial Division, Minneapolis-Honeywell Regulator Company.

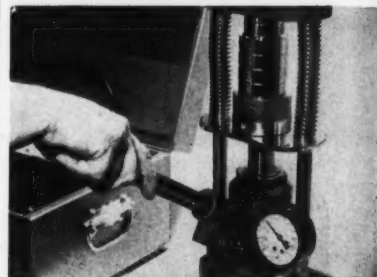
Check 3924 opposite last page.

Instrument magnetic-tape recorders are considered in eight-page Bul 55B—Precision Instrument Company.

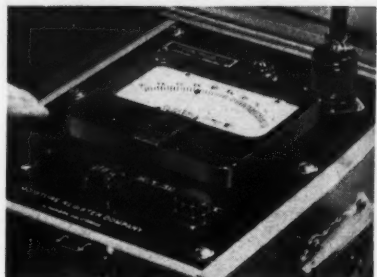
Check 3925 opposite last page.



FEED IT...



SQUEEZE IT...



READ IT...

G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 3926 on reader service card.

**ELECTRONIC
MOISTURE REGISTER**
Instruments

Moisture Register Co., Dept. CP
P.O. Box 910, Alhambra, Calif.

Check 3926 opposite last page.

CHEMICAL PROCESSING

Going all out to insure customer satisfaction, Dewey & Almy maintains constant vigilance over product purity. Lending a big hand . . .

Polyethylene pipe assures ferrous-free PVAc emulsions

"PRODUCT QUALITY" are mighty important words at Dewey and Almy's (Division of W. R. Grace & Co.) Owensboro, Kentucky polymer plant. The multi-million-dollar installation is proud of its ability to turn out "custom-tailored" polyvinyl acetate emulsions and butadiene-styrene latices which it markets under tradenames Darex and Everflex. (See *CHEMICAL PROCESSING*, May 1960, p. 146.)

Total capacity is over 20 million pounds per year. Quality control is such that company guarantees batch-to-batch uniformity. Salesmen boast that their customers can place orders with full assurance that the first and last pounds will precisely duplicate each other.

Production facilities are specially designed for flexibility and efficiency. Changeovers from one product to another can be made quickly with minimum risk of contamination between batches. Rigid control practices are in effect throughout the process.

The precautions are not relaxed when reactions are completed either. Take for example the PVAc emulsions. After passing a series of tough quality control tests, products are ready to be transferred to storage.

Rigid Polyethylene Pipe Plays Key Role

To insure continued peak purity, emulsions are moved through linear polyethylene pipe by 20-psi moisture-controlled air to phenolic-lined tanks. There are more than 2060 feet of this pipe in the plant. Measuring three inches in diameter, it is used both vertically and horizontally. The pipe is supported every six feet when installed horizontally.

Although linear polyethylene pipe is well known for its resistance to corrosion, it was primarily selected by D & A to prevent ferrous contamination. Studies had shown that conventional metal pipe, because of its rough interior, has a tendency to deposit small flakes of metal into the emulsion. Stainless steel and glass were also investigated, but were rejected because of high installation costs.

Polyethylene pipe filled the bill perfectly. Its smooth bore minimizes the risk of clogging and contamination. The pipe's properties are such that live steam at relatively high pressure may be passed through it for cleaning.

Time and labor requirements for installation are considerably less than with other pipe. Its light weight is a definite advantage. Long

To insure continued peak purity, polyvinyl acetate emulsions are stored in 6000- to 12,000-gal phenolic-lined tanks. The entire area is served by linear polyethylene pipe. Product is conveyed through the pipe by moisture-controlled air

Close-up shows fittings and couplings used on pipe. The only tool needed to put sections together is an ordinary wrench. No pipe-end preparation of any kind is required

sections of pipe can be easily handled by one man.

Fittings Save More \$\$\$

Installation costs were further reduced by the use of economical and efficient couplings and fittings. Known as the Victaulic Method of joining plastic pipe, sections were quickly and easily connected with an ordinary wrench.

Ends of the polyethylene pipe are grooved for the reception of the couplings and fittings. Housing clamps "float" in the grooves, combine with the resiliency of the gaskets and permit angular deflection in any direction without leakage. Each coupling handles the contraction or expansion of the pipe it connects — automatically relieving longitudinal and settlement stresses.

Sections are ready to go on stream immediately upon assembly, not requiring any time for setting or hardening,

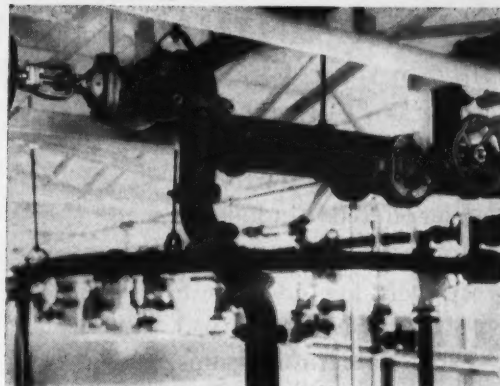
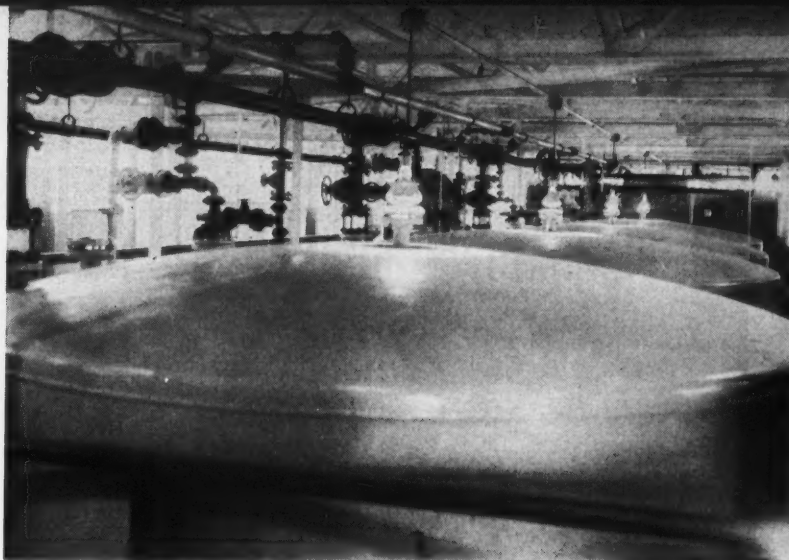
as is the case with conventional cemented joints.

Another feature of the system is that it provides a union at every joint. Couplings can be easily disconnected for maintenance or clean-out. Adjoining sections do not have to be disturbed. Cleaned pipe can be put back on line and made ready for use in matter of minutes.

Fittings are constructed with long radii sweeps for good hydraulics and minimum friction loss. Ample wall thickness is provided for protection against corrosion and abrasion.

(Hi-Mol polyethylene pipe was supplied by Carlon Products Corporation, 10225 Meech Avenue, Cleveland 5, Ohio.) Check 3927 opposite last page.

(Further information about Victaulic Method of Piping may be obtained from Victaulic Company of America, 835 Lehigh Ave., Union, N.J.) Check 3928 opposite last page.



Chemically Inert Dry Bearing Material

Chemloy 719*

use without lubricant!

Chemloy 719 is proving to be the most *universal* dry bearing material ever offered to industry:

...because its extremely low coefficient of friction invites use where lubrication is impossible, impractical or undesirable.

... because it may be used on both sliding and rotating applications over a wide temperature range.

... because it is impervious to practically all known chemicals, solvents or corrosives.

... because it is excellent under vibration or shock service conditions.

... because it will not conduct electricity or cause galvanic corrosion.

Chemloy 719 is available in all basic forms—such as sheet, rod or tubing—or in parts molded or machined to specifications. Get full details.

*The best in Teflon based bearing materials.

Request Bulletin T-120 and Price Sheet No. 126, or send b/p specs. for quotation on molded or machined parts. Crane Packing Company, 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ontario.

Teflon is a DuPont Trademark

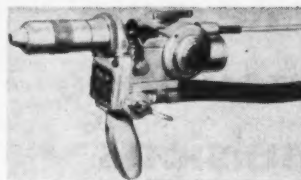


CORROSION CONTROL

**Cost of ceramic coatings
reduced by design
of spray gun**

Spray gun for applying ceramic coatings to base materials, especially metals, will permit use of rods up to 1/4" in diameter.

An auxiliary air supply unit will enable a larger amount of



Spray gun applies protective coatings with greater speed

protective material to be applied with greater speed and intensity. Availability of extension-equipment in different wave lengths permits an easier and more efficient use of gun in many otherwise unreachable interiors.

(R-2 Rokide metal spray gun is product of Metallizing Company of America, Inc., 3520 W. Carroll Ave., Chicago 24, Ill.)

Check 3930 opposite last page.

Cathodic protection automated at plant in Bataan

Announcement is made of a system of automated corrosion control by cathodic protection. It is a system whereby a reference electrode measures the potential of the cathode and, as required, actuates an automatic controller. This controller, in turn, adjusts a rectifier to maintain the potential of the cathode area within protective limits.

Such a system has been designed for an oil refinery soon to go on stream in Bataan. It will protect both the steel pilings of the piers and 2000' of submarine pipeline. Other installations are currently being made in the United States.

This system has application wherever protective requirements vary or where adequate supervision of the cathodic protective system cannot be

PUMPING MOLTEN CHEMICALS?

write **TABER**

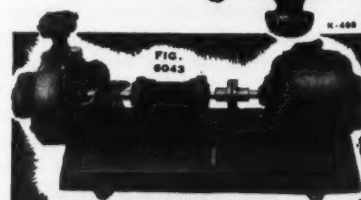
Whatever your pumping needs... why not put it up to Taber... long experienced pump specialists. Vertical pump illustrated, 19,478, for pumping molten chemicals. Horizontal pump, 6043, handles black liquor, caustic, etc., in evaporator service; or transfers fluids under vacuum.

FIG. 19,478

WRITE, ON
BUSINESS
STATIONERY
FOR
BULLETIN
V-837

**TABER
PUMP CO.**

Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.



TABER

Check 3931 opposite last page.

CHEMICAL PROCESSING

CORROSION CONTROL

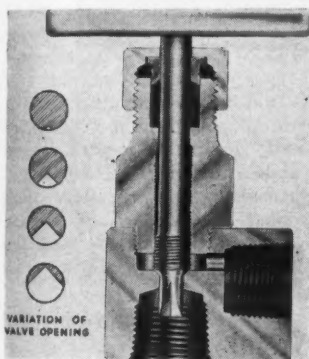
maintained. It can be used in such applications as acidic waste tanks, hot water storage tanks, condenser water box interiors, intake and discharge flumes, traveling screens, offshore pipelines.

(Automated cathodic protection system is development of Electro Rust-Proofing Corporation, 30 Main St., Belleville 9, N.J.)

Check 3932 opposite last page.

Metering, throttling valve handles boiling HCl or H₂SO₄

Tapered orifice valve allows highly accurate flow control for both clog and vibration resistance. Unit has low tur-



Flow through valve is regulated by moving stem with tapered slot into or out of the seat

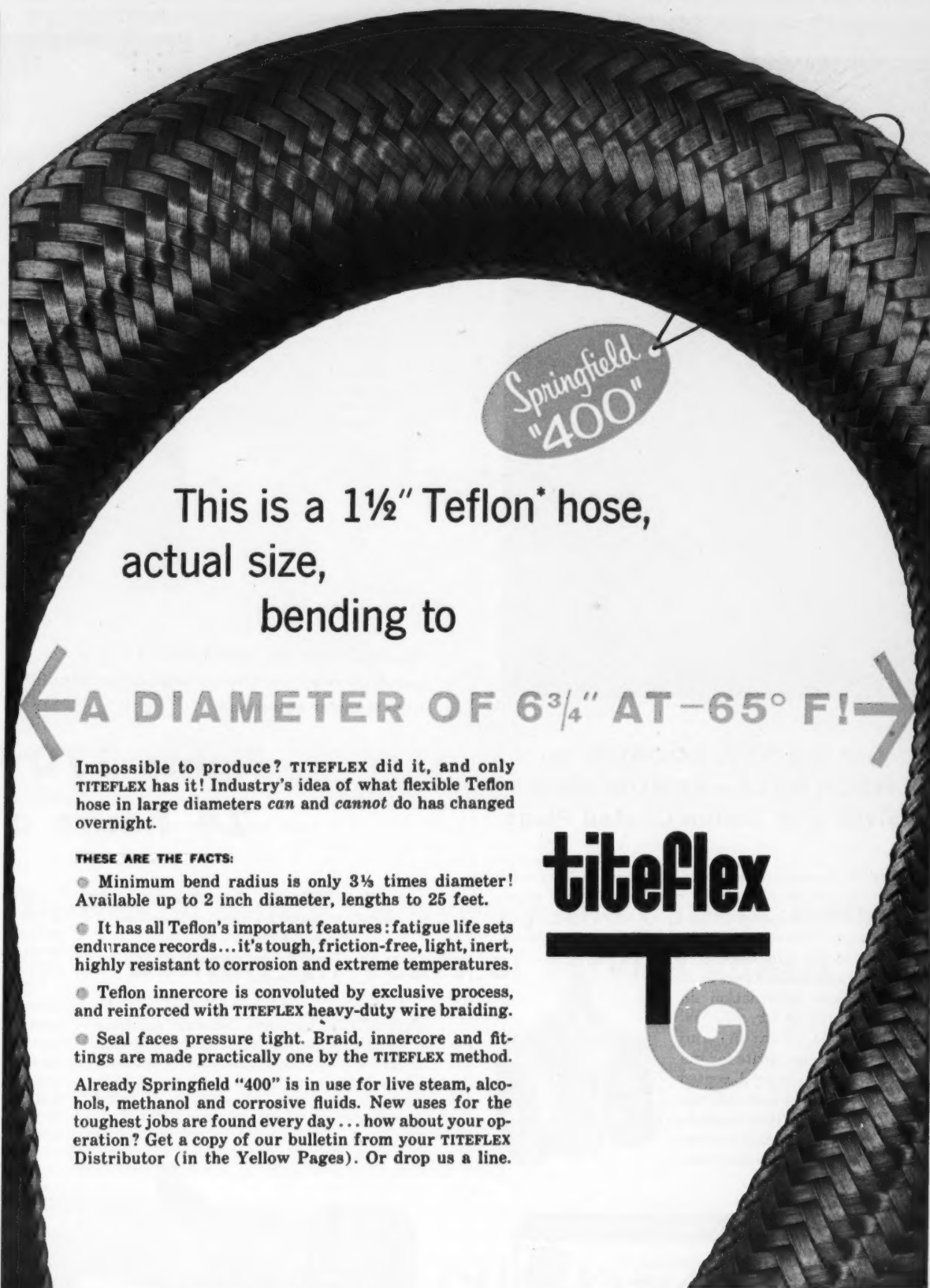
bulence, low friction flow and vibration-free operation. It is non-freezing and abrasion resistant.

Valve is being made of Uscolite polyvinyl chloride and Uscolite copolymer with Teflon packing. With this construction, it is suitable for 300 psi service with sulfuric acid.

Valve is also made of Hastelloy Alloy B for use with concentrated boiling hydrochloric acid, wet hydrochloric acid gas and sulfuric acid. This unit also has Teflon packing. It is suitable for 3000 psi working pressure.

(Veegroo tapered orifice valve is product of General-American Valve Co., PO Box 444, Corona Del Mar, Calif.)

Check 3933 opposite last page.



This is a 1½" Teflon* hose,
actual size,
bending to

← A DIAMETER OF 6¾" AT -65° F! →

Impossible to produce? TITEFLEX did it, and only TITEFLEX has it! Industry's idea of what flexible Teflon hose in large diameters *can* and *cannot* do has changed overnight.

THESE ARE THE FACTS:

- Minimum bend radius is only 3½ times diameter! Available up to 2 inch diameter, lengths to 25 feet.
- It has all Teflon's important features: fatigue life sets endurance records... it's tough, friction-free, light, inert, highly resistant to corrosion and extreme temperatures.
- Teflon innercore is convoluted by exclusive process, and reinforced with TITEFLEX heavy-duty wire braiding.
- Seal faces pressure tight. Braid, innercore and fittings are made practically one by the TITEFLEX method.

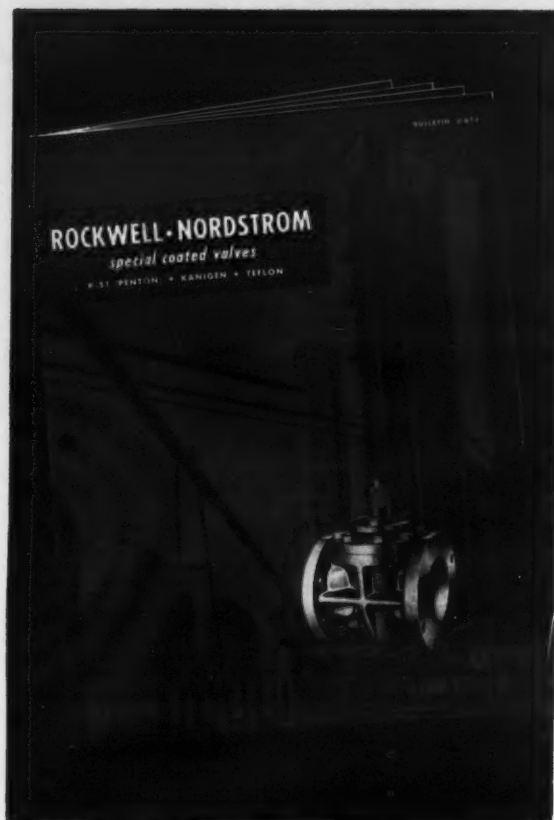
Already Springfield "400" is in use for live steam, alcohols, methanol and corrosive fluids. New uses for the toughest jobs are found every day... how about your operation? Get a copy of our bulletin from your TITEFLEX Distributor (in the Yellow Pages). Or drop us a line.

titeflex

titeflex inc. springfield mass. PACIFIC DIVISION • SANTA MONICA • CALIFORNIA

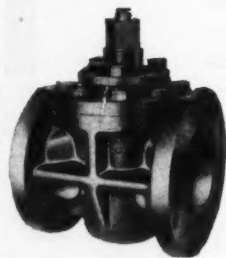
*T. M. of duPont
**T. M. of Titeflex, Inc., Pat. Pend.

Check 3934 opposite last page.



**Get this NEW BOOKLET on
ROCKWELL—NORDSTROM
Valves with Teflon Coated Plugs**

Rockwell-Nordstrom standard pattern valves with Teflon coated plugs are now available for use where infrequent or inadequate plug valve lubrication might be expected. The coating of tough Teflon gives added lubricity to the plug for longer valve life and easier operation. For complete information on Teflon, as well as corrosion resisting K-51 (Penton) and Kanigen coatings, write for the new booklet on special coated valves to: Rockwell Manufacturing Co., Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.



Check 3935 opposite last page.

**CORROSION
CONTROL**

Supervisor C. H. Draper examines Saran-lined pipe serving impervious graphite heat transfer equipment at Diamond Alkali. Arrow points to end of one of the exchangers that cools 260° muriatic acid to 90°F



Photo by CP Staff

Proving that it has what it takes for this tough service, 'workhorse' impervious graphite heat transfer equipment . . .

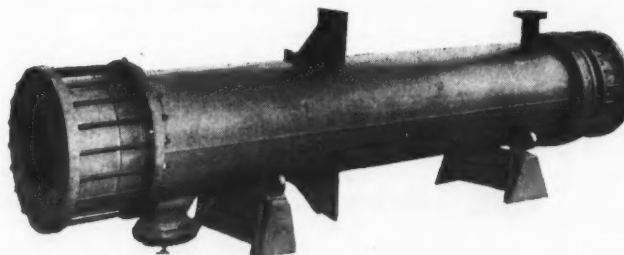
Fights 270°F HCl 24 hours a day

TED F. MEINHOLD, Associate Editor
with **C. H. DRAPER**, Technical Supervisor
Chlorinated Products Division
Diamond Alkali Company
Painesville, Ohio

MAKING hydrogen chloride gas from hydrochloric acid can be a tough order — even under the best conditions. The corrosive nature of the beast is such that it can put improperly designed equipment out of commission fast.

Diamond Alkali, at its Painesville, Ohio plant, turns out about 40 tons per day of anhydrous HCl from 36% muriatic acid feedstock. The plant has a total of three HCl stripping systems in operation.

"Workhorses" of the installation are three vertically-mounted, Karbate impervious graphite shell-and-tube reboilers serving the 37"-diam by 25'-high continuous stripping columns. The units have proven that they can take the rugged duty — as evidenced by the fact that the first graphite heat exchanger went into



Shell-and-tube heat exchangers of this type, but mounted vertically, are used as reboilers for the HCl strippers

operation as far back as 1947.

The reboilers feed hot 270° F acid to the strippers on an around-the-clock basis. Each of the graphite units has 233- $\frac{1}{4}$ " ID by 9'-long tubes. Shell size is 28". Total heat transfer surface on the outside of the tubes is 684 sq ft. Design rating is approximately 2.5 million Btu per hr.

All surfaces coming into contact with the corrosive material are made of impervious graphite. Tubes are cemented into graphite tube sheets at each end of the bundle. A steel baffle assembly permits efficient passage of steam around the tubes.

The fixed-tube sheet is gasketed against the shell flange and the fixed-cover is gasketed against the fixed-tube sheet by bolts extending between a metal backing flange and the shell flange.

The equipment's full floating-end construction minimizes danger of leakage between shell- and tube-side fluids. All graphite parts are subject to compression loading only — eliminating possibility of mechanical damage.

Easy Maintenance

Tubes can be cleaned either chemically or mechanically. Tube replacement — if needed — is quick and simple. Tube bundle is completely removable. Diamond Alkali has replaced the tubes about once every four years.

Impervious graphite heat exchangers are also used in another part of the HCl stripping system. Muriatic acid (20%) drawn off from bottom of column is cooled from 260° down to 90°F prior to being sent to storage. Units used for this purpose are horizontally-mounted and have 80 $\frac{3}{8}$ "-diam by 9'-long graphite tubes.

(Further information about Karbate impervious graphite heat exchangers may be obtained from National Carbon Company, A Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York.)

Check 3936 opposite last page.



Operator checks Ni-Resist pump at Pennsalt Chemical's Portland plant. This particular unit was manufactured by A. R. Wilfley & Sons, Inc. of Denver,

Colorado, and pumps caustic at a concentration of 50%. The Duriron Company, Inc. of Dayton, Ohio, also supplied Ni-Resist pumps for the plant.

Ni-Resist pump...eleven years caustic service behind it...years of service ahead

Ni-Resist* pumps have been in caustic service at the Portland, Oregon plant of the Pennsalt of Washington Division, Pennsalt Chemicals Corporation, for eleven years...

Eleven years of pumping cell liquor containing 9.3% caustic soda at 170°F to evaporator feed storage...

Eleven years of pumping 50% caustic at 80-90°F to storage after concentration...

Eleven years of pumping 50% caustic from storage into tanks for

shipment.


In regular caustic service, Type 2 Ni-Resist iron offers you proven corrosion resistance. When corrosion resistance *plus* thermal shock resistance are needed... Type 3 Ni-Resist iron does the job.

Equipment parts made of Ni-Resist cast iron stand up to alkalis, acids, salts. They resist erosion, protect product purity. What's more, you have eight Ni-Resist irons to choose from. Each one is a proven

engineering material with one or more outstanding properties — pressure tightness... extra-low thermal expansion... high stain resistance.

You'll find the answer to your corrosion problem in this family of high-nickel irons. Get all the details. Write for "Engineering Properties and Applications of Ni-Resist."

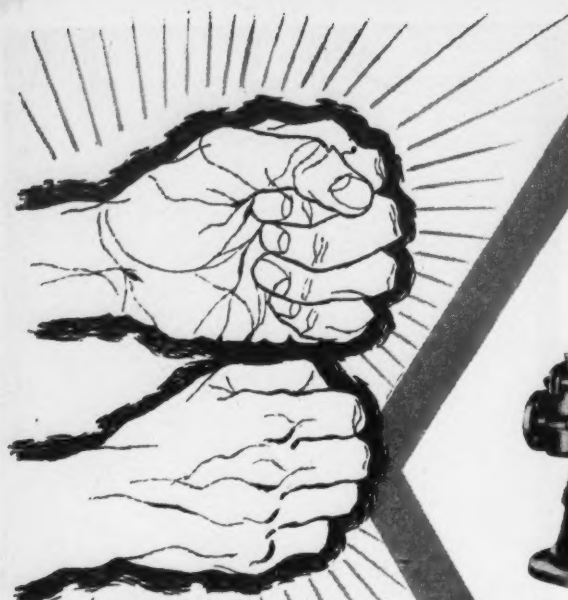
*Registered trademark

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street  New York 5, N. Y.

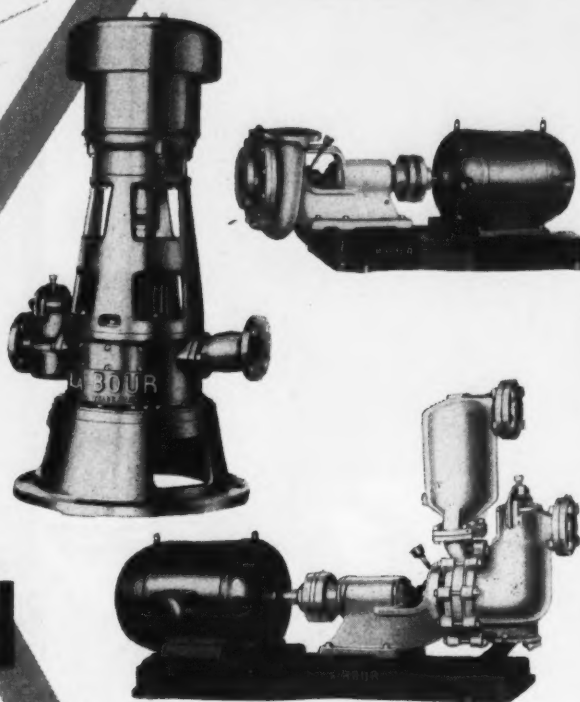
INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Check 3937 opposite last page.



TWO Fisted Performance



In pumping chemicals, maximum service satisfaction is dependent on *two* factors. Design and construction quality constitute one factor; the other is the accuracy of the foundry in meeting metallurgical specifications for corrosion resistance.

Because LaBour pumps embody such important and exclusive features of design it is perhaps easy to overlook the fact that LaBour foundries employ equipment and techniques second to none for precise control of alloy composition and grain structure.

That's why, when you buy LaBour, you get *two*-fisted performance assurance. Top ability to resist corrosion *and* top ability to move liquids economically and dependably are combined in these pumps. Ask for Bulletin B-1b.

REGULAR PRODUCTION IN LaBOUR FOUNDRIES INCLUDES THESE ALLOYS:

Electric Furnace Cast Iron
Bronze
Lead
Aluminum
R-55 (Chrome-Nickel)
Y-17 (Chrome-Nickel-Molybdenum)
Y-30 (Nickel-Molybdenum)
149 Stainless Steel
304 Stainless Steel
316 Stainless Steel
Elcomet K (High Nickel Stainless)

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 3938 opposite last page.



CORROSION CONTROL

Modified epoxy coating withstands corrosives at 450-550°F

One-component corrosion-resisting coating will protect metal surfaces against acids, alkalis, salt spray, sulfur fumes, oxygen-laden waters and steam. It will withstand the combined attack of corrosive conditions and temperatures up to 450°F continuously and up to 550°F intermittently. Coating is based on a modified epoxy resin.

In one application at a steel plant, coating was applied to a building adjacent to slag pit, which is continuously exposed to corrosive sulfur fumes and heat. After two years, coating is still holding up well.

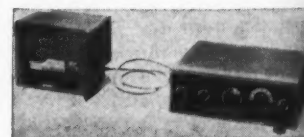
In another application the coating is satisfactorily resisting the action of strongly alkaline soaps. In a third application, coating is resisting the combined attack of high temperatures, salt water and atmospheric conditions on boilers and steam tubes.

(DA-8 coating is product of Markal Co., 3052 West Carroll Ave., Chicago 12, Ill.)

Check 3939 opposite last page.

Corrosion research field aided by accurate electrobalance

A recently developed electrical balance that will record sample weights automatically and accurately should be of considerable value in corro-



Balance is simple and compact

sion research. It will remain accurate for weeks without recalibration.

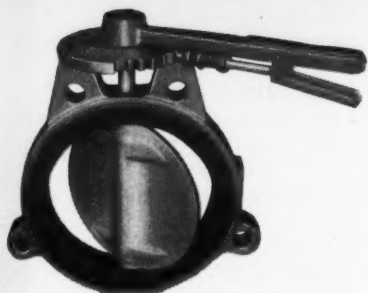
Balance is simple, compact and relatively inexpensive. You do not have to see it to use it — it is self-balancing inside apparatus. It will record changes in sample weight while operator is off

ROCKWELL VALVES for TIGHT SHUT-OFF

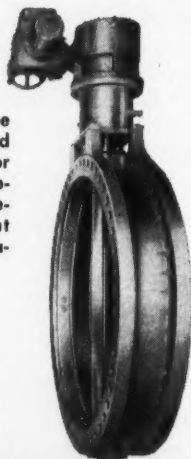
MANUAL OR
AUTOMATIC

Sizes to 144"

- SPACE-SAVING
- QUICK-ACTING
- STRAIGHT-THRU FLOW



Butterfly valve with "Keelok" snap-in, easily removable, elastomer liner; for sure, tight closure and for corrosive service.



Butterfly valve with inserted rubber seat for drop-tight closure; seat replaceable at site of installation.

Write
for
Bulletins

W. S. ROCKWELL COMPANY

2200 Eliot St. • Fairfield, Conn.

Made and sold in Europe by
COCKBURNS, Ltd., Glasgow S W 7, Scotland

Check 3940 opposite last page.

CORROSION CONTROL

doing other things.

Balance is based on the null-balance principle. Any change in sample weight causes the beam to move, momentarily. This motion causes a change in phototube voltage, which is amplified and then applied to a coil attached to the beam. The coil is in a magnetic field, and current through it exerts a moment on the beam, instantaneously restoring it to balance. The coil current is thus an exact measure of sample weight.

(RM Electrobalance is product of Cahn Instrument Company, 14511 Paramount Blvd., Paramount, Calif.)

Check 3941 opposite last page.

Aluminum hopper cars will handle sulfur

A major railroad has ordered 200 open-top aluminum hopper cars for handling sulfur. All of these cars are made of alloy 5083 in an all-welded construction. Aluminum bodies rest on a steel center sill.

Selected coating and caulking materials were used to prevent corrosion between the aluminum and steel as well as to avoid crevice corrosion within the bodies.

(For further information on aluminum hopper cars contact Reynolds Metals Company, Reynolds Metals Bldg., Richmond 18, Va.)

Check 3942 opposite last page.



"... First a word from
our sponsor ..."

Life in these excited states...



"I don't care if it
does do the trick
in your attic!"

KEN BOYER

"WAM" PUMP finest you can buy



Highest pumping efficiency, with faultless corrosion resistance. Hard rubber casing and impeller; Hastelloy C shaft. 80 gpm. Bul. CE-55.

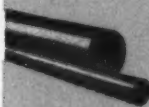
THRIFTY- THROATED VALVES



Liquids never touch metal in Ace diaphragm valves! Rubber or plastic-lined cast iron, or solid plastic bodies. Sizes 1/2 to 6". Ask for facts.

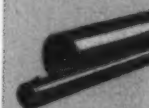
ACE-ITE

all-purpose toughness



High-impact, rubber-plastic, most economical for average chemicals. 1/2 to 6". Screw or solvent welded fittings. Valves 1/2 to 2". NSF-approved. Bul. 80A.

RIVICLOR ageless strength



All-purpose rigid PVC. Sched. 40, 80 & 120, 1/2 to 4". Threaded or socket-weld fittings. Valves 1/2 to 2". NSF-approved. Free Bul. CE-56.

Fire the bucket brigade!

No time for passing the bucket when corrosion threatens. With one quick decision you put an end to 85 to 100% of these problems. Just specify Ace chemical-resistant plastic piping and rubber-protected equipment. The long-term cost is a drop in the bucket. American Hard Rubber Company's 108 years of experience is at your service.

ACE chemical resistant equipment

BY **AMERICAN** HARD RUBBER COMPANY

DIVISION OF **AMERACE** CORPORATION

ACE ROAD • BUTLER, N.J.

See ACE equipment in
Chemical Engineering Catalog



Check 3943 opposite last page.

R_x for product purity: a Stainless Steel dryer

You're looking deep into a rotary warm air dryer. It is 72" x 360" and was sold to a pharmaceutical firm. They will use it to dry pharmaceutical chemicals, so cleanliness is of great importance. That's why this dryer is being built entirely of Stainless Steel.

Here are the reasons why the fabricator, General American Transportation Co., chose Type 316 Stainless for this complex assembly. Product purity must be maintained, of course, and Stainless Steel's surface is so smooth and easily cleaned that it can't harbor contamination.

To keep costs down, the material must be easy to fabricate. In this dryer, there are 257 flights of various shapes designed for uniform drying movement. The shapes are radially welded to the inside of the dryer shell. Again, Stainless fills the bill. No wonder General American chose Stainless for a custom-designed job like this.

If you need a material that must assure product purity, design with Stainless Steel. It's economical, easy to fabricate and join, resists corrosion and practically never wears out. Buy USS Stainless Steel through your local U. S. Steel representative or your nearest Steel Service Center.

USS is a registered trademark



United States Steel Corporation - Pittsburgh
American Steel & Wire - Cleveland
Columbia-Geneva Steel - San Francisco
National Tube - Pittsburgh
Tennessee Coal & Iron - Fairfield, Alabama
United States Steel Supply - Steel Service Centers
United States Steel Export Company
United States Steel

This mark tells you a product is made of modern, dependable Steel.







FIRST ... the valve itself—Lapp porcelain, chemically inert, to resist corrosion from any acid (except Hydrofluoric) in a process.



NEXT ... layers of strong Fiberglass cloth to cushion the porcelain against impact and insulate it against thermal shock.



AND THEN, high-strength, chemical-resistant Epoxy resin, impregnating the Fiberglass, bonding it to the porcelain—adding the protection of armor to the corrosion resistance of Lapp chemical porcelain.

TUFCLAD[®]...

THE EXTRA PROTECTION YOU GET IN LOW-COST
LAPP PORCELAIN VALVES

Lapp
CHEMICAL
PORCELAIN

WRITE for Catalog 567—description and specifications of Lapp Y-Valves and Angle Valves, available in 1/2" to 6" sizes. Lapp Insulator Co., Inc., Process Equipment Division, 2108 Chestnut St., LeRoy, N. Y.

Check 3944 opposite last page.

CORROSION CONTROL

Temperatures up to 425°F resisted by Teflon-lined expansion joint

Teflon-lined expansion joint is suitable for use at full vacuum and up to 150 psi at temperatures to 425°F. Liner is resistant to all chemicals except certain alkalis and fluorine at elevated temps.

Unit has rubber covering, resistant to high tempera-



Expansion joint is suitable for use in full vacuum and pressures to 150 psi

tures, and steel inserts built in the flanges. Wire mesh construction as integral part of support gives additional strength without reducing flexibility. Unit fits standard pipe flanges. Is available in standard sizes of 2 to 12" and sizes to 26" upon application.

In one field test a chemical manufacturer has used an expansion joint of this type successfully between a reboiler on the bottom of a distillation column and a reactor vessel. The vessel handles a corrosive organic material at full vacuum and 300-310°F. Joint has given good service on this application.

(Teflon-lined expansion joint is product of John L. Doré Co., P. O. Box 7772, Houston 7, Texas.)

Check 3945 opposite last page.

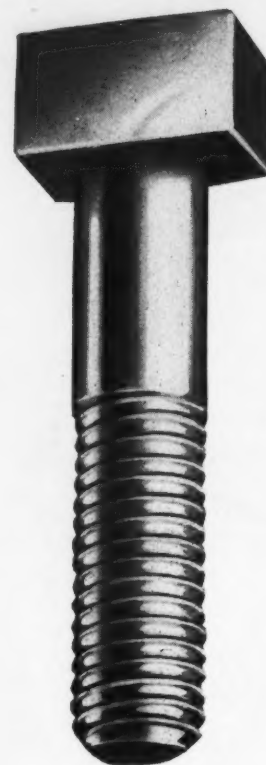
NEXT MONTH

Microbiological corrosion and how it was brought under control with an amine-type treatment will be covered in detail in an article to appear in September.

lower cost

TEE BOLTS

by an exclusive method



Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket tee head bolts are made in standard sizes 1/4" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and nonferrous metals, including Titanium



FOR THREADED SPECIALTIES...

PAWTUCKET

MANUFACTURING COMPANY

327 Pine St. • Pawtucket, R. I.

THE PLACE TO SOLVE YOUR BOLT PROBLEMS

"The Bolt Man" T.M. REG.

Check 3946 opposite last page.

CHEMICAL PROCESSING

NEW LITERATURE Corrosion Control

Properties of tungsten, tantalum, molybdenum and columbium are listed on handy chart. Reverse side has temperature conversion chart for centigrade-fahrenheit scales covering 0-6500°F range. Tungsten chart — Fansteel Metallurgical Corporation.

Check 3947 opposite last page.

Penton Buyers Guide lists manufacturers of chemical processing equipment utilizing chlorinated polyether linings and components. The 22-page booklet lists sources for pipe, pumps, tank liners, tube, valves and other parts. "Penton Buyer's Guide" — Cellulose Products Department, Hercules Powder Company Incorporated.

Check 3948 opposite last page.

Both armored and non-armored impervious graphite pipe and fittings are treated in 12-page bulletin. Methods of connections are shown. Maintenance of pipe is also discussed. Bul 965-2 — Engineering Department, Falls Industries, Inc.

Check 3949 opposite last page.

Flexible pressure hose capable of withstanding -80 to 250°F within pH range of 5 to 11, is illustrated and described in four-page brochure. The all-synthetic product consists of a polyamide inner tube reinforced with high tensile strength yarn. Cat "Nylaflo Pressure Hose" — The Polymer Corporation of Penna., a subsidiary of The Polymer Corporation.

Check 3950 opposite last page.

Corrosion resistance comparison chart is highlight of 38-page technical catalog on PVC pipe and fittings. Specifications and various engineering data are included. "Kraloy Plastic Pipe" — Kraloy Plastic Pipe Co., Inc.

Check 3951 opposite last page.

Corrosion problems existing in chemical and allied industries are listed in 26-page data file. Coating systems used to control these conditions are described. Chemical Corrosion Data File — Protective Coatings Division, Pittsburgh Coke & Chemical Company.

Check 3952 opposite last page.

How to weld and braze cobalt-containing alloys is topic of technical reprint. Over 20 alloys are considered. "The Welding and Brazing of Certain Cobalt-Containing Alloys" — Cobalt Information Center, Battelle Memorial Institute.

Check 3953 opposite last page.

Yours For The Asking!

Jamesbury Corp.

PRODUCT DATA SHEET #1

The Double Seal Ball Valve is designed for use in applications where high pressure and high temperature are required. It is available in sizes from 1/2" to 12" and in materials of stainless steel, titanium, and Inconel.

After 10 years of service, the Double Seal Ball Valve is still the most reliable and longest lasting valve in the industry. It is the only valve that can be used in applications where the valve is required to operate at high pressure and high temperature.

For more information, please contact Jamesbury Corp., 64 New Street, Worcester, Mass. 01099.

Jamesbury Corp.

PRODUCT DATA SHEET #2

The Double Seal Ball Valve is designed for use in applications where high pressure and high temperature are required. It is available in sizes from 1/2" to 12" and in materials of stainless steel, titanium, and Inconel.

After 10 years of service, the Double Seal Ball Valve is still the most reliable and longest lasting valve in the industry. It is the only valve that can be used in applications where the valve is required to operate at high pressure and high temperature.

For more information, please contact Jamesbury Corp., 64 New Street, Worcester, Mass. 01099.

Jamesbury Corp.

PRODUCT DATA SHEET #3

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After 10 years of service, the Double Seal Ball Valve is still the most reliable and longest lasting valve in the industry. It is the only valve that can be used in applications where the valve is required to operate at high pressure and high temperature.

For more information, please contact Jamesbury Corp., 64 New Street, Worcester, Mass. 01099.

FACTUAL DATA

Jamesbury Corp.

PRODUCT DATA SHEET #5

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Jamesbury Corp.

PRODUCT DATA SHEET #6

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For more information, please contact Jamesbury Corp., 64 New Street, Worcester, Mass. 01099.

Jamesbury Corp.

PRODUCT DATA SHEET #7

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After 10 years of service, the Double Seal Ball Valve is still the most reliable and longest lasting valve in the industry. It is the only valve that can be used in applications where the valve is required to operate at high pressure and high temperature.

For more information, please contact Jamesbury Corp., 64 New Street, Worcester, Mass. 01099.

Jamesbury Corp.

PRODUCT DATA SHEET #8

The Double Seal Ball Valve is designed for use in applications where high pressure and high temperature are required. It is available in sizes from 1/2" to 12" and in materials of stainless steel, titanium, and Inconel.

After 10 years of service, the Double Seal Ball Valve is still the most reliable and longest lasting valve in the industry. It is the only valve that can be used in applications where the valve is required to operate at high pressure and high temperature.

For more information, please contact Jamesbury Corp., 64 New Street, Worcester, Mass. 01099.

on Jamesbury BALL VALVES AS VERSATILE AS INDUSTRY ITSELF

Get the full story on Jamesbury Corp.'s complete line of "Double-Seal" Ball Valves and accessories. Learn why the Jamesbury "Double-Seal" Ball Valve has been labeled "as versatile as industry itself". Get all the facts on materials, sizes, etc. They are yours for the asking: the facts about Jamesbury Corp. — the nation's foremost exclusive manufacturer of Ball Valves.

JAMESBURY CORP.
NEW STREET, DEPT. PDS, WORCESTER, MASS.
Please send me the Data Sheets checked below.

#1 #2 #3 #4 #5 #6 #7 #8

Name..... Title.....
Company.....
Address..... City..... State.....

JAMESBURY CORP., 64 NEW STREET, WORCESTER, MASS.
Distributors in Principal Cities

Check 3954 opposite last page.

126-0



JAMESBURY BALL VALVES
HELPING BUILD OUR NUCLEAR NAVY



CP Staff Photos

Live storage of bags and drums, rapid automatic filling and partially automatic palletizing save manpower as . . .

Efficient packaging line helps Pfizer fill increased fine chemicals demand

DANA B. BERG,
Executive Editor
with **WALTER ELWOOD,**
Plant Manager
Chas. Pfizer & Company, Inc.
Groton, Connecticut

PROBLEM: It became more and more obvious that manual handling and filling of multiwall bags and fiber drums was becoming outmoded and would not keep pace efficiently with increased demand for fine chemicals from the Chas. Pfizer plant in Groton, Conn. Manpower needs began to mount disproportionately. Some "more-automated" system was needed to meet the

strong competition.

Solution: Pfizer, starting in mid-1959 with a "modernization" that is almost completed now, has put in equipment that puts the handling and packaging on as near an automatic basis as possible.

Fiber drums, for example, are rolled in from dock onto a network of roller conveyors where they are stored and removed as needed. They are taken from this network and put on roller conveyor that takes them through manual thermo-labeling as needed. After this step, they roll onto pneumatic elevator that takes them, two at a time, to declining roller-conveyor sys-

tem that carries them to any one of four storage "legs" close to packaging machine.

Multiwall bags are brought in on skids on roller conveyor, and are manually placed, in stacks, in packaging machine with automatic feeder.

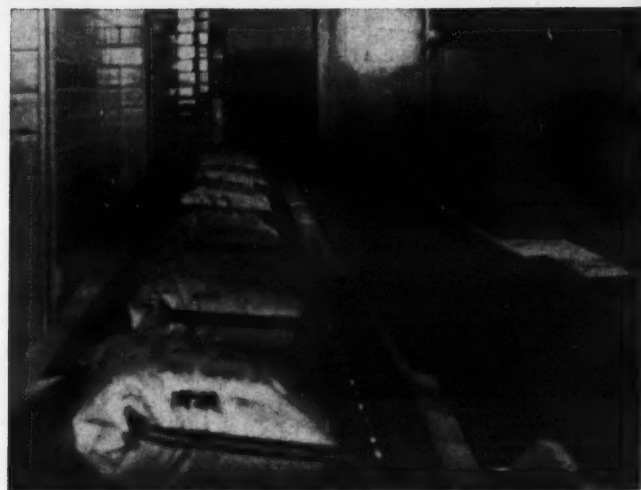
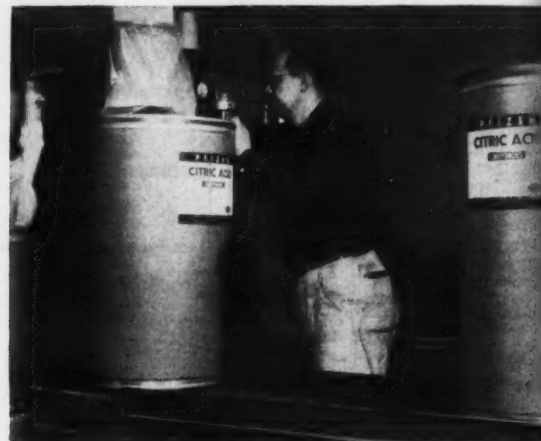
Filling

Most requests are for the 100-lb-net bag. Filling is done in an air-conditioned room at

CP MATERIAL HANDLING and PACKAGING

Automatic open-mouth bagging and sewing at Chas. Pfizer in Groton, Conn. This operation normally requires only 10-15 minutes of one man's attention every hour

Drum lots are custom-filled from separate delivery spout at back of bagging machine



Filled bags pass through checkweighing operation in background and go up, over and down to palletizing in separate warehouse building. When drums are being filled by bagging machine (out of sight in foreground at far right), they go down roller conveyor to right of bag conveyor

the rate of about 10 bags/minute on a Vredomatic open-mouth bag-packing machine which provides an accuracy of plus-or-minus 2 oz. Feeding, positioning, filling, settling, closing and sewing are automatic; all that is required is attention to feed hopper, bag magazine and twine supply needs. All packer parts contacting product are 304 stainless steel.

After filling and closing,



Bag palletizing. Empty pallets are dispensed, by switch, as needed, from magazine at right. Bags can just be seen coming down conveyor in background. Drums come down retarding conveyor to right of bag conveyor

bags are taken away by conveyor and fall over to lie flat on roller conveyor that leads them through checkweighing system in the line.

Fiber drums are custom-filled from spout at back of the same packer. These drums are brought over from storage "legs" on roller conveyor on which they are positioned under delivery spout of machine.

The packer has a self-contained electrical system with a counter calibrated in desired drum weights, and set by selector switch. Scale automatically cycles the number of times required to give desired net weight.

Filled drums are then taken away via roller conveyor which moves them through same checkweighing system as the bags. Only bags—or drums—may be filled and handled at any one time.

After checkweighing, the bags or drums are taken up through connecting tunnel which ties together two buildings—production and warehouse. A belt conveyor raises them up one floor to the tunnel. At the top a diagonal guide rail shunts the drums to a separate conveyor while the bags, being able to pass under the rail, continue on the belt conveyor.

Palletizing Next

The bags go down on this belt conveyor which deposits them on separate swingable belt conveyor that carries them to palletizing operation. A man takes them off the end of this conveyor and stacks them on pallet in pre-arranged pattern.

Filled drums come down on conveyor that has adjustable retarding bars. It's timed so that drum enters downgrade roller in time to be held by a bar so it doesn't come down the grade too fast and out of control. Separate conveyor section takes drum to pallet on which four of them, one layer, are placed.

Empty pallets are dispensed one at a time from stack kept filled by lift truck. A push of a button moves pallet out from bottom of stack into loading position, and at the same time moves loaded pallet toward point of loaded-pallet-pickup by fork truck.

System is indexed so that pallet is moved ahead a half-pallet-length at a time when loading drums. Thus, after two drums have been placed side-by-side on pallet, a push of the button will move dispenser's take-away conveyor into position so that the next two drums will go into place on

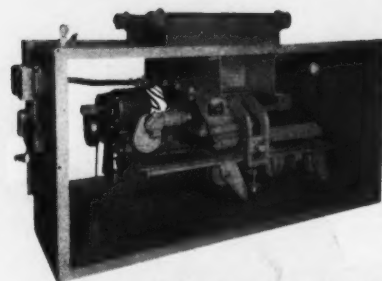
looking toward
IMPROVED PRODUCTION
... look to Hardinge !

HARDINGE FEEDERS

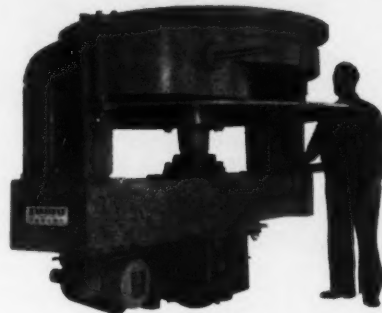
Hardinge Feeders are available in sizes and types to meet your specific requirements.

Constant-Weight Feeders, Volumetric Belt Feeders, Disc Feeders and Rotary Pocket Feeders are offered. All Hardinge Feeders are suspended from feed bins or tracks and need little head room. Costly feeder support structures are unnecessary; equipment following the feeder is readily accessible. When track-mounted, one Hardinge Feeder may serve a number of bins, intermittently.

For the Hardinge Feeder story, with drawings, photos and detailed specifications, ask for 12-page bulletin No. 33-E-13.



A Hardinge Constant-Weight Feeder® mounted in a dust housing, with side covers removed. Observation windows are provided in covers. Note track-mounting wheels at top.



84-inch diameter Hardinge Disc Feeder for installation in a lime and cement plant.

Extra-long (96 inch) conveyor type Hardinge Volumetric Belt Feeder designed for bin mounting.



HARDINGE
COMPANY, INCORPORATED

Main Office and Works • 240 Arch St., York, Pa.

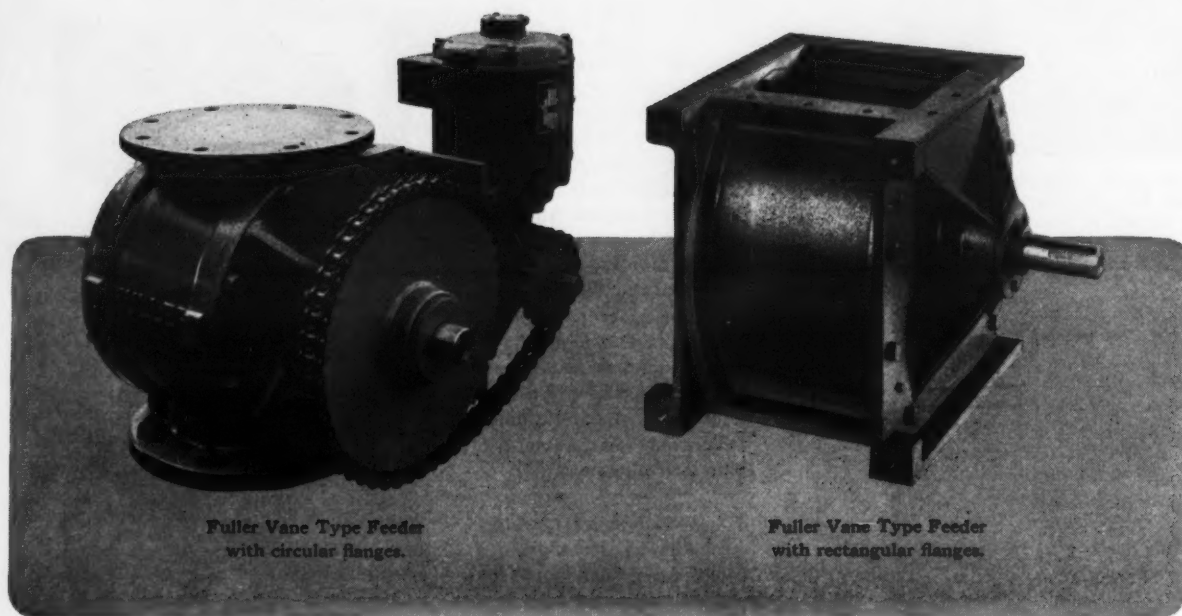
"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
TORONTO
CHICAGO
HIBBING
SALT LAKE CITY
SAN FRANCISCO
HOUSTON
LAKELAND
BIRMINGHAM

Check 3955 opposite last page.

Fuller Feeders Keep Conveyors Flowing Freely

**... whether the load
is a few pounds a minute
or many tons an hour**



Fuller Vane Type Feeders assure you of dependable handling of dry, pulverized and granular materials. They're available in capacity ranges to meet all normal plant requirements, and are built with circular or rectangular outlets. Check these Fuller cost-saving features...

Extra-rugged construction. Heavy, cast iron body walls and headplates add rigidity, longer life. Stainless or other metals can be used where sanitary or corrosion requirements demand their use.

Sealed bearings are equipped with Alemite

fittings for ease of lubrication and long life. Abrasive particles can't enter, maintenance is cut.

Make effective air locks. Fuller Vane Type Feeders can be used as air locks for pressure differentials up to $3\frac{1}{2}$ lbs.

Stuffing boxes and ball bearings for vacuum, low-pressure and general applications.

And, where extreme volumetric accuracy without pulsation is needed, there's a line of Fuller Roll Type Feeders. For full details on Fuller Feeders write for Bulletin.

See Chemical Engineering Catalog for details and specifications .

1306
F-20



FULLER COMPANY
177 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Check 3956 opposite last page.

HANDLING & PACKAGING

the pallet, next to the two drums already there.

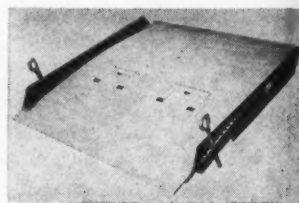
Results: Change to this almost fully automatic system of filling and handling has enabled Pfizer to keep up with increasing production, and at the same time has saved considerable manpower. It has permitted upgrading of labor previously used for much of this work, so that the men could be transferred to other, higher-level work.

(Conveyor system and pallet dispenser designed by Alvey Conveyor Manufacturing Co., 9301 Olive Street Road, St. Louis 32, Mo.)

Check 3957 opposite last page.

(Vredomatic packer is a development of St. Regis Paper Co., 150 E. 42nd St., New York 17, N.Y.)

Check 3958 opposite last page.



Capacities to 50,000 lb

... per axle load are feature of all-steel dockboards which also incorporate positive pin-drop safety device that provides easy-to-adjust stop. One man and fork truck can lift, transport and position dockboard.

(Heco all-steel dockboards are manufactured by Hamerslag Equipment Company, 110 Freeway Blvd., South San Francisco, Calif.)

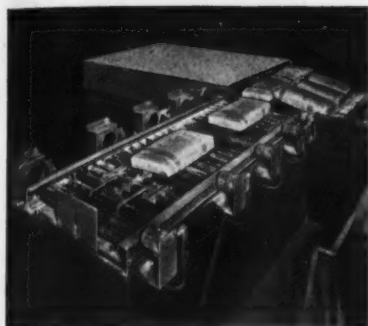
Check 3959 opposite last page.

Mobile hydraulic crane handles up to ton

Uses: Lifting, transporting and positioning loads up to one ton on floor or truck.

Features: Adjustable control valve provides faster lifting speeds for light loads—extra power for easier lifting of heavy loads. Variable needle-

THIS AUTOMATIC BAG PALLETIZER will save you money!



The Miller Palletizer automatically positions bags in proper pattern on the roller table. A completed pattern then moves across the rollers to an elevator, which descends one position as each layer is added. At full load position, the stack and pallet move automatically from the elevator for pick-up by a fork truck.

IF your plant is operating around the clock (7 days per week, 24 hours per day), and —

IF bag stacking is a part of that operation —

the MILLER AUTOMATIC PALLETIZER is almost certain to save you money. This completely automatic, operatorless unit is specifically engineered to slash production costs in two- and three-shift plants.

Just compare the cost of your present stacking operation with that of a Miller Automatic Bag Palletizer. (Price: \$25,000-\$30,000).

While you're thinking about it, write for bulletin describing operation of the Miller Automatic Palletizer in detail!

MILLER ENGINEERING CORPORATION

119-B East Barbee Avenue
Louisville, Kentucky

Check 3960 opposite last page.

AUGUST 1960

HANDLING & PACKAGING

type release valve assures precise control over lowering speeds, holding.

Description: Of lightweight, high-strength construction, crane is mounted on heavy-duty roller-bearing wheels and casters. Towing handle is positioned waist-high on mast. Speed of mast rotation is controlled by brake.

Maximum effort never exceeds 50 lb due to combination of double-action pump and two-speed valve. Four models and complete line of accessories available.

(Mobile one-ton hydraulic cranes are manufactured by Ruger Equipment Incorporated, 137 W. Fourth St., Uhrichsville, Ohio.)

Check 3961 opposite last page.

22,000 lb lifted at 45 fpm by in-plant gas trucks

Uses: In-plant lifting and handling of heavier loads.

Features: Highest capacity —22,000 lb—available in cushion-tire, gas-powered industrial truck. Full loads lifted at 45-fpm rate.

Description: Two models available in manufacturer's G-5 line. First has 22,000-lb capacity at 24" load center, and turning radius of 110". Second has 27" load center, 12" wider wheelbase, and turning radius of 122". Both are 125 1/4" long from face of fork carriage to rear of counterweight.

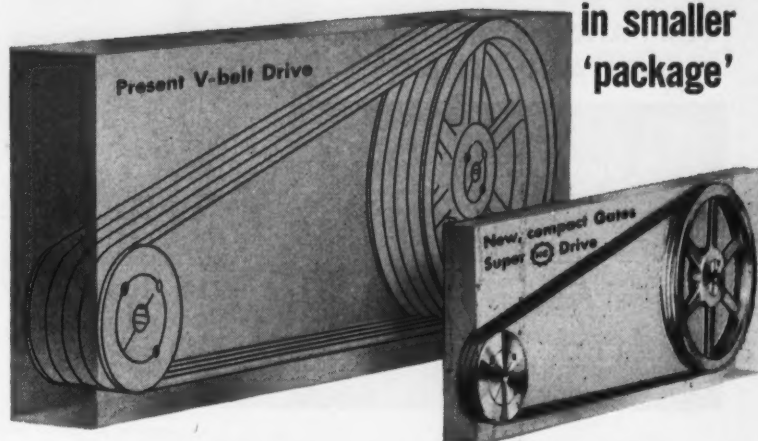
Two-speed-range full automatic transmission and torque converter with 2.17-to-1 torque multiplication furnish rapid acceleration and instantaneous power response. Left pedal of dual brake pedal arrangement controls precision inching.

Piston-type hydraulic accumulator reduces shocks due to rough terrain. Power steering and power-assisted brakes are standard equipment, as is safety seat brake.

(G-5 22,000-lb-capacity trucks are development of Yale Materials Handling Division, The Yale & Towne Manufacturing Company, 11,000 Roosevelt Blvd., Philadelphia 15, Pa.)

Check 3962 opposite last page.

Same HP
capacity
in smaller
'package'



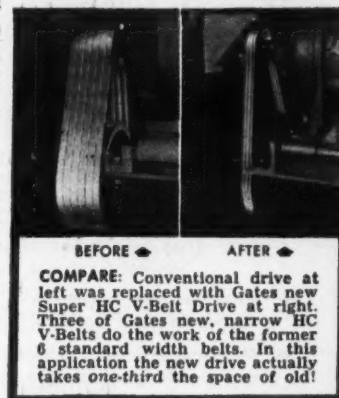
Industry cuts drive costs as much as 20% with Gates high capacity V-Belts

By putting power transmission in a smaller package, Gates 'performance-proved' Super HC V-Belt Drive has cut costs all along the line—for all kinds of industries—since its introduction more than a year ago.

As a replacement drive on equipment *inside* the plant, or as the drive on equipment *manufactured for sale* the Super HC Drive has enabled thousands of industrial users and OEM's to reduce sheave diameters 30% to 50%, overall drive space up to 50%, and drive weight 20% and more. *Initial drive cost has been cut as much as 20%.*

Nation-Wide Engineering Service

A Gates Distributor can show you how to effect savings with Super HC V-Belt Drives. Ask him for your free copy of "The Modern Way to Design Multiple V-Belt Drives," or write to The Gates Rubber Company Sales Division, Inc., Denver, Colorado.



COMPARE: Conventional drive at left was replaced with Gates new Super HC V-Belt Drive at right. Three of Gates new, narrow HC V-Belts do the work of the former 6 standard width belts. In this application the new drive actually takes one-third the space of old!

TPA 535

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario



World's Largest Maker of V-Belts

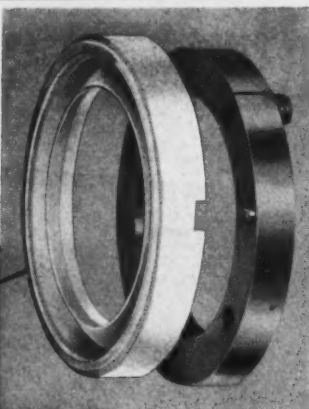
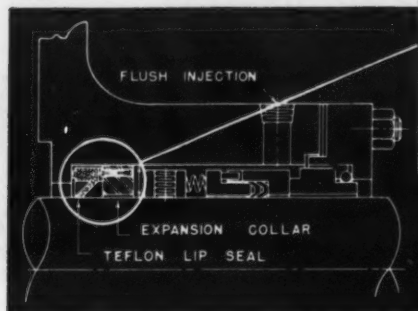
Gates Super V-Belt Drives

Check 3963 opposite last page.

DURA LIP SEAL

For use with Dura Seal
to control liquid injection
in stuffing boxes

FOR HANDLING ABRASIVE
FLUIDS AND SLURRIES



DURA LIP SEAL

Composed of two parts:
Left, Teflon lip sealing
ring; Right, split expansion
Collar for retaining
lip sealing ring in
operating position.



DURA LIP SEAL provides a flow control for liquid injection in stuffing boxes. Its purpose is to prevent abrasives in the process fluid from interfering with the function of the Dura Seal. A split Collar is expanded firmly against the stuffing box bore retaining a Teflon lip sealing ring that regulates the amount of dilution. FOR MORE INFORMATION, WRITE FOR BULLETIN NO. 491 - CP

DURAMETALLIC CORPORATION

KALAMAZOO, MICHIGAN

Check 3964 opposite last page.

HydroLectric the Modern Truck

... with the
Greatest Flexibility
to Application

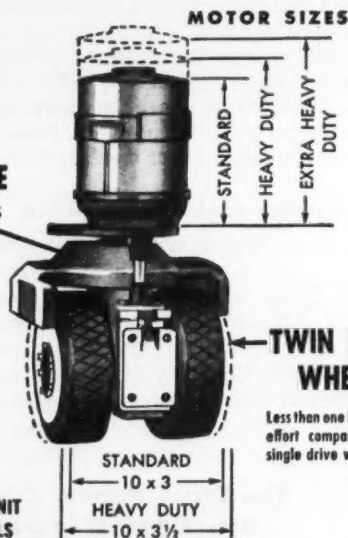
MAKE A COMPARISON

3 GEAR RATIOS AVAILABLE
without changes in Gear Centers



- ★ Instantaneously braking with the handle in any position.
- ★ Maintenance simple and infrequent — designed to make it easy to service brushes, contacts, tires — within minutes.

THE EXCLUSIVE DYNA-DUAL POWER UNIT
IS INTERCHANGEABLE ON ALL MODELS



**TWIN DRIVE
WHEELS**

Less than one half steering
effort compared to wide,
single drive wheel.

LIFT TRUCKS, INC.

CINCINNATI 14, OHIO



Check 3965 opposite last page.

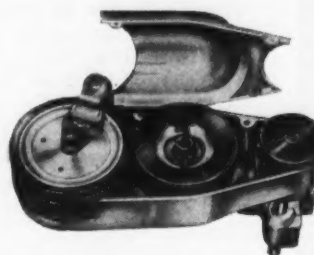
HANDLING & PACKAGING

**Up to 150,000 impressions
from plastic solid
inking cylinder**

Coder roller won't drip,
gum up; cleans easily

Uses: Coding filled bags,
packages, cartons and ship-
ping containers.

Features: Solid inking cyl-



Self-contained ink supply is fea-
ture of coder

inder is fabricated of Pore-
lon®, micron-porous, micro-
reticulated plastic, which
holds in suspension enough
ink for up to 150,000 impres-
sions. Roller can't drip or
gum up, and is easily cleaned
with swipe of damp cloth.

Description: Friction-oper-
ated coder accepts printing
types, dyes and logotypes.
Printing head and plastic

*Trademark of S. C. Johnson and Son, Inc.

cylinder are held in place by
simple locking devices, mini-
mizing downtime for change-
overs.

Capable of printing in three
colors—violet, red, black and
green are available—simul-
taneously, coder is adjustable
for positive on-the-spot reg-
ister or random printing, and
may be used for overhead
printing. Models with 1" and
3" printing faces are avail-
able.

(Teko Coder is development
of Thomas Engineering Co.,
9257 Laramie Ave., Skokie,
Illinois.)

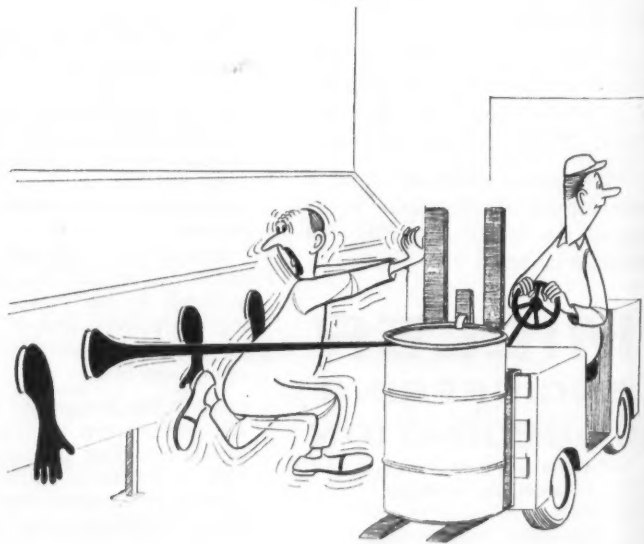
Check 3966 opposite last page.

**56,000 lb force exerted
by bunker cushion**

Uses: Pneumatic bunker
cushion for bins and hoppers.

Features: When inflated
with recommended 45 psig
pressure, cushion exerts force
of approximately 56,000 lb.

Description: Rubber shock
cords connect membrane and
exhaust valve thereby provid-
ing 100% mechanical control,
so that deflation cannot occur
until cushion has reached
fullest height. Cords also ac-
tuate exhaust valve and re-
lieve shock load stresses
caused by sudden removal of



UC 10/11

CHEMICAL PROCESSING

HANDLING & PACKAGING

opposing load.

Cushion consists of rubber diaphragm bolted to reinforced steel base which includes both inlet port and exhaust valve. It measures 31.5 x 39.4" when installed and reaches operating height of 15.75".

(Clouth bunker cushions are manufactured by Tressler Engineering Products Division, 17 Battery Pl., New York 4, N.Y.)

Check 3967 opposite last page.



20 bags per minute

... can be loaded by one operator with power-driven conveyor and power stacker.

Touch of a button moves conveyor out over a truck bed or into a box-car under electric power, providing continuous flow of bags and control of delivery position of the stacker belt. Operator merely guides bag or package into place. Conveyor has discharge arc of 180°.

(Power-curve conveyor is product of Power-Curve Conveyor Co., 2187 S. Jason St., Denver 23, Colo.)

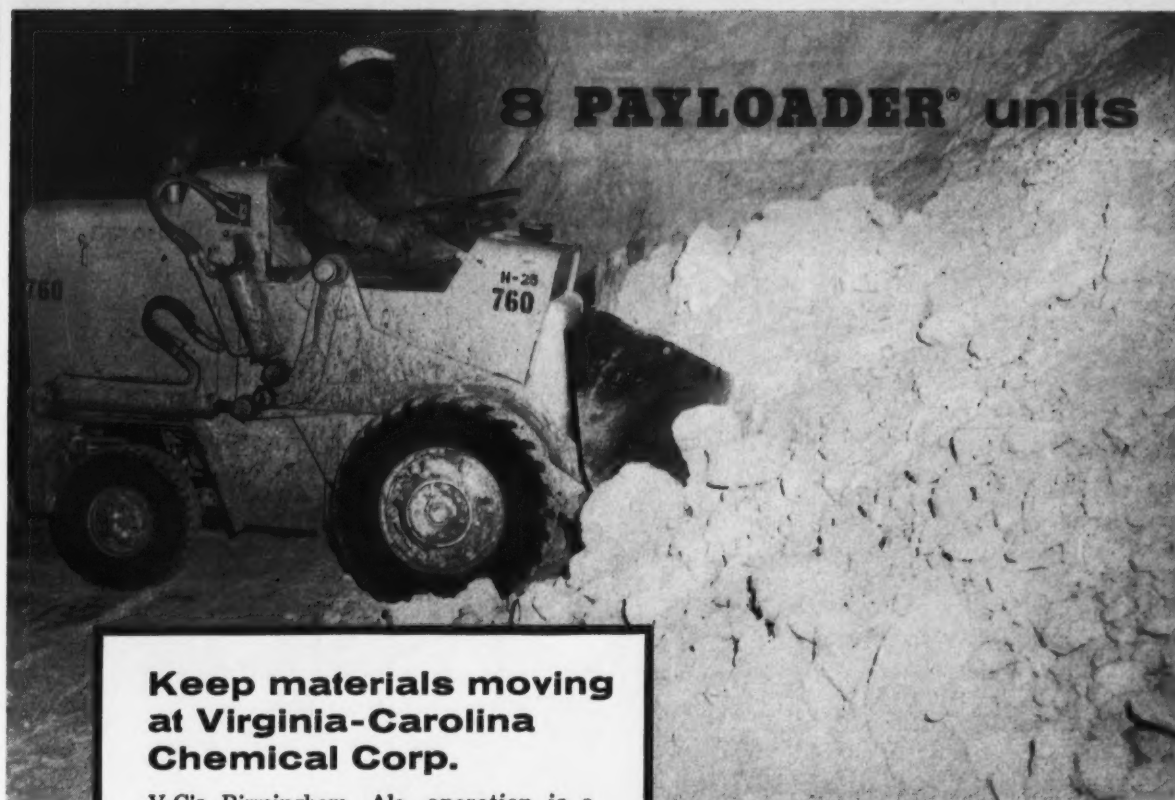
Check 3968 opposite last page.

Greater pressure longer for aerosol cans now

Uses: Packaging of aerosol products.

Features: Greater side-seam bond stability enables three-piece soldered cans to hold higher pressures at elevated storage temperatures for longer periods. Extends range of possible aerosol applications.

Description: Conventional bi-metallic soldering system has been fortified into three-



Keep materials moving at Virginia-Carolina Chemical Corp.

V-C's Birmingham, Ala. operation is a complete wet-mix manufacturing facility and includes a sulphuric acid plant. Eight "PAYLOADER" units are used for all phases of material handling, including the charging of sulphur to the melting vat, the moving of railroad cars, unloading potash from box-cars and in-process handling.

J. F. Lotz, Plant Superintendent says of his two newest units, "The Model H-25 'PAYLOADER' units are versatile and fast in all-around plant operations. They have twice the delivery capacity of the older Model HA's, and are faster in the storage pile."

Speed, capacity, maneuverability and ease of operation are combined in the H-25 for big production all day long. With only 6-ft. turning radius, it features 2,500 lb. operating capacity, power-shift transmission, torque-converter drive, power-steering, power-transfer differential and fast, powerful hydraulic bucket control. Closed, pressurized hydraulic system plus filters and seals throughout the machine assure effective protection in dusty conditions.

A nearby Hough Distributor is ready to show you what a "PAYLOADER" can do for your bulk materials handling.

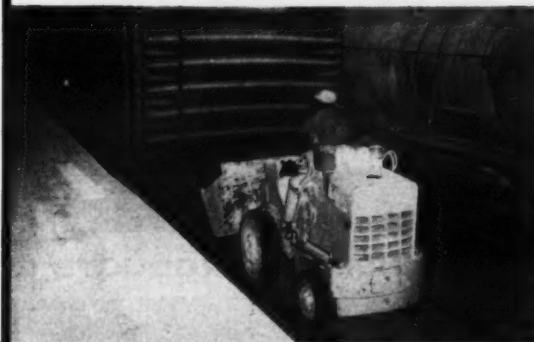
HOUGH®



THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY



4,500 lbs. of breakout power easily digs full bucket loads of hard super phosphate.



Spotting railroad cars is all in a day's work for the powerful, rugged H-25's.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

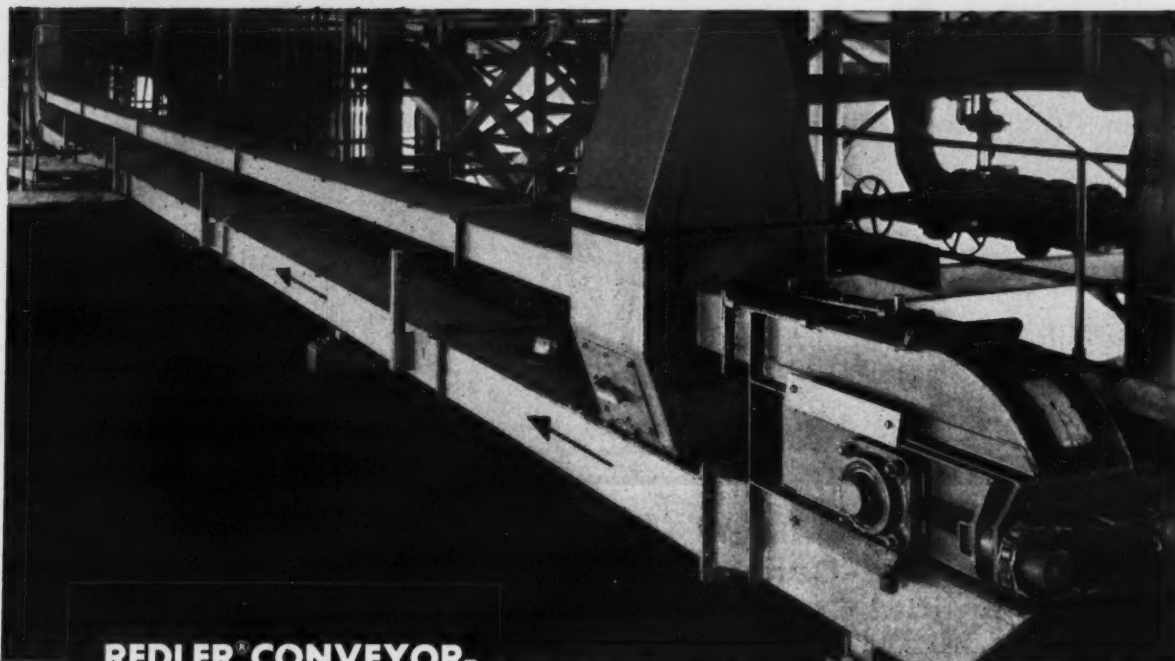
S-A-1

- ☐ Send data on H-25 "PAYLOADER"
☐ Larger models — to 12,000 lb. operating capacity

Name.....
Title.....
Company.....
Street.....
City..... State.....

Check 3969 opposite last page.

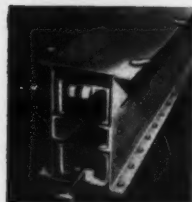
STEPHENS-ADAMSON



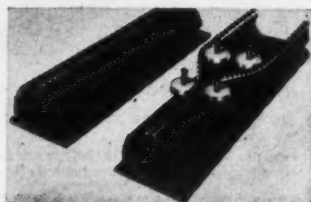
**REDLER® CONVEYOR-
ELEVATORS SPEED
EFFICIENCY, LOWER
BULK CHEMICAL
HANDLING COST**

S-A REDLER Conveyor-Elevators have been in successful operation for over 25 years, with well over 20,000 units now handling a wide range of pulverized, granular, small lump and flaked materials, in plants throughout the world. The REDLER Conveyor-Elevator moves material by an EN MASSE action horizontally, vertically, on inclines, or around bend corners. All movement is continuous and takes place within totally enclosed, dust-tight, compact casings, permitting large tonnages to be handled in small space. The conveying element is a series of U-type skeleton flights which move readily around sprockets, and bend corners with relatively low power required at the drive. Skeleton flights may easily be unhooked and replaced without tools. Handles up to hundreds of tons per hour and provides maximum versatility to handle hundreds of bulk chemical materials.

S-A ENGINEERED PRODUCTS FOR CHEMICAL HANDLING SYSTEMS



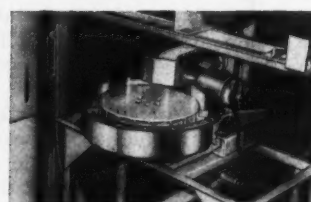
Cutaway Section REDLER Conveyor-Elevator shows skeleton flights loaded and unloaded.



"ZIPPER" CLOSED-BELT CONVEYOR-ELEVATOR—BULLETIN 349



BELT CONVEYORS—REQUEST CATALOG DATA



CONTINUOUS WEIGHER—BULLETIN 958



WRITE
FOR
BULLETIN
358



**ENGINEERING DIVISION
STEPHENS-ADAMSON MFG. CO.**

GENERAL OFFICE & MAIN PLANT,

11 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

Check 3970 opposite last page.

HANDLING & PACKAGING

component one. Resultant stronger can permits wider selection of propellant mixtures.

Cans will be manufactured in sizes ranging from 3-16 oz in same styles as conventional cans.

(Tricom aerosol cans are development of Continental Can Company, Continental Can Building, 100 E. 42nd St., New York 17, N.Y.)

Check 3971 opposite last page.



Palletless handling

... of fragile containers and bulky materials is possible with electric trucks equipped with carton clamp attachment and load side shift.

Carton-grab arm design assures equal distribution of clamping pressures while high friction contact surfaces prevent scuffing.

(Model H with grab arms is available from Lewis-Shepard Products, Inc., 125 Walnut St., Watertown, Mass.)

Check 3972 opposite last page.

Read crane-load weights up to 50 feet away

Uses: Overhead crane-scale weighing.

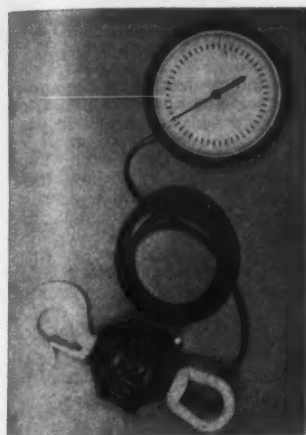
Features: Indicator can be mounted at eye level for reading weights up to 50 feet from load element on crane. "Sensor" cell assures trouble-free operation.

Description: Load element and indicator are separate units linked by up to 50' of flexible double-wire braid hose.

Element provides for automatic self-alignment under

CHEMICAL PROCESSING

HANDLING & PACKAGING



Safety factor is five times rated capacity for remote indicating crane scale

tension—indication isn't affected by up to 4° misalignment. It has 360° calibration, 25% tare adjustment, on 12" dial.

Calibrated and sealed at factory, it does not require outside power source. System is available in 1000- to 60,000-lb capacities.

(Remote indicating crane scale is product of Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif.)

Check 3973 opposite last page.

Two-ton-capacity electric

... is latest addition to line of cushioned-tire fork trucks. Model is equipped with carbon-pile drive control to permit stepless acceleration for "inching" operations.

Loaded, truck can ascend 10% grade and travel at speeds up to 6.2 mph forward or reverse. Lift speed with standard upright is 36 fpm while lowering speed is 70 fpm. Outside turning radius is 70".

Overall length with 40" forks is 117½"; wheelbase is 47"; width 38"; aisle for right-angle stacking, 82½" plus load length; weight, with 36v battery, approximately 7850 lb.

(EC-40 fork truck is product of Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.)

Check 3974 opposite last page.

Fills easy



Empties clean



Floor inverter



Sling inverter



Powell's simplified **Invert-a-bin®** eliminates need for costly unloading equipment at every use-point

One grab and rotating attachment on standard lift truck, one sling type inverter with monorail or crane, or one floor type inverter and fork truck can service any number of use-points. No costly permanent unloading station required at each point of use.

Invert-a-bin® ideal for in-plant or inter-plant handling. Fills easily—empties clean. Can handle the most difficult materials in that it can be tumbled, aerated, and vibrated. Available in steel and aluminum.

Semi-bulk handling with the Invert-a-bin® replaces costly disposable packages, provides maximum flexibility with minimum capital investment and freight free advantages. Our Invert-a-bin® sales manager, Mr. Lew Lubenow, and our representative in your area are available to assist you in making an engineering and economic survey.

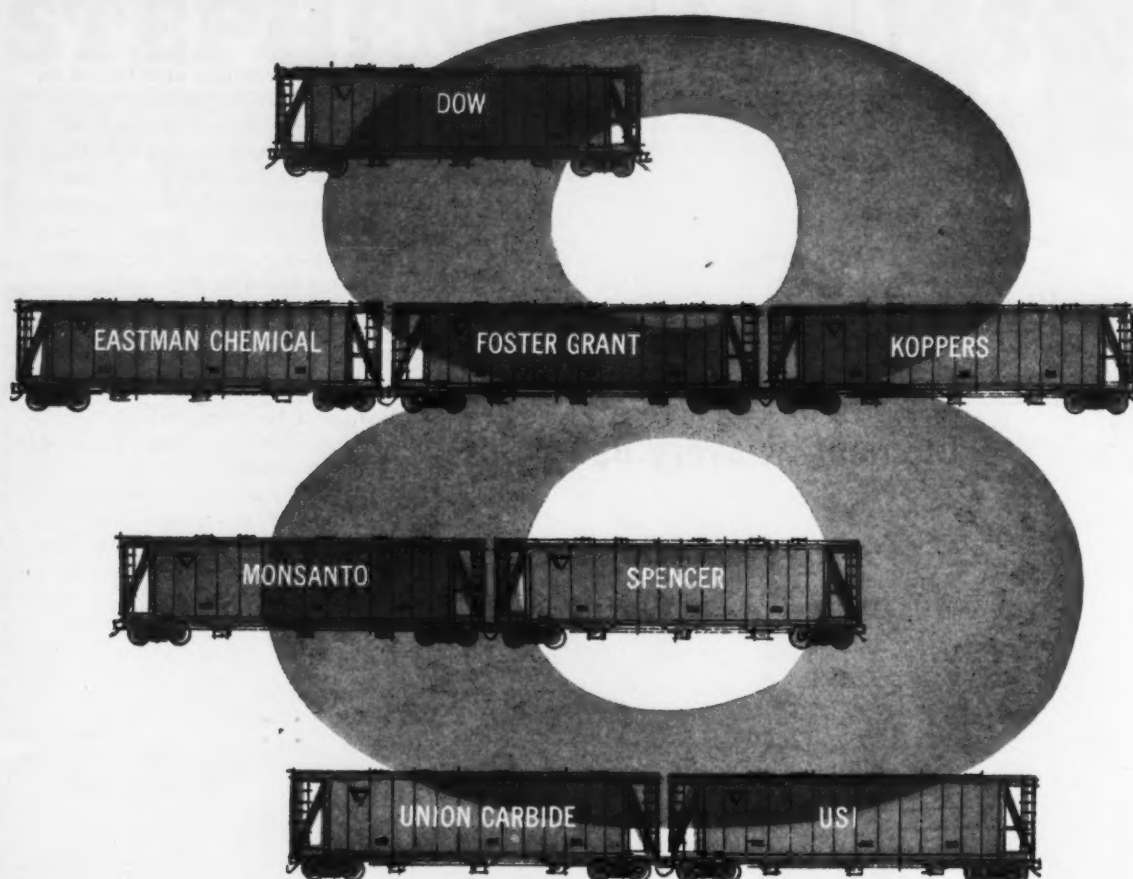


THE POWELL PRESSED STEEL COMPANY

250 ERIE ST. • HUBBARD, OHIO

Lic. under Pat. #2862645

Check 3975 opposite last page.



8 major chemical companies
are now using the
DRY-FLO® CAR for
bulk shipment of **POLYETHYLENE**
and **POLYSTYRENE**

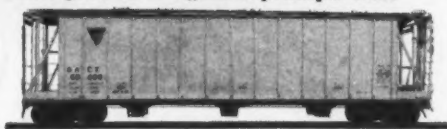


Airlide® and Dry-Flo® Car Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street • Chicago 3, Ill. • Offices in principal cities

Ask the nearest General American office about the
advantages of bulk shipment for your product.



The Dry-Flo® car provides maximum sanitation and
full protection for materials that require careful handling.

Check 3976 opposite last page.

NEW LITERATURE

Material Handling and Packaging

Vibrating feeders that are compact and require little headroom in feeding a wide range of bulk materials are illustrated and described in 12-page booklet. Two-color drawings show how these units can be fit into new or existing installations, photographs reveal how the units are being used in existing installations. A chart shows variations possible in cable suspension or floor mountings. Capacities range from five to 1700 tons/hr. Book 2869 — Link-Belt Company.

Check 3977 opposite last page.

Air hoist maintenance, operation and inspections are presented in 12-page Service Manual 10756 — Thor Power Tool Company.

Check 3978 opposite last page.

Industrial truck with 7000-lb capacity and featuring carbon-pile control system for greater speed control and operator safety is subject of Model F-50T7 Bul — The Elwell-Parker Electric Company.

Check 3979 opposite last page.

Aerosol history and growth, markets and products, container availability and industry services are outlined in 28-page Aerosols Booklet — Continental Can Company.

Check 3980 opposite last page.

Four methods of bulk handling, equipment required, investment necessary and formula for evaluating these are described and pictured in Handling Methods Bul — Spencer Chemical Company.

Check 3981 opposite last page.

Automatic handling of fly ash with pneumatic equipment is explained in four-page Fact File ER-49-3 — Fuller Company.

Check 3982 opposite last page.

Storage structures, square-type tanks, live-bottom storage bins and variety of special bins for specific applications are presented in Bul 207-A — Sprout, Waldron & Co., Inc.

Check 3983 opposite last page.

Belt-conveyor line, expanded to lengths ranging from 18 to 240' and capable of capacities to 480 tph, is covered in 20-page Redi-Fab Cat — Barber-Greene Company.

Check 3984 opposite last page.

Built tough

for round-the-clock service in grueling applications



Pre-Bilt conveyors are available in belt widths of 18, 24, 30 and 36 inches. Truss and channel structural frames are designed to AISE standards for spans up to 50 ft. Supporting bents, chutes and other accessories are standardized.

Safe practices in materials handling operation are detailed in Safety Kit — Towmotor Corporation.

Check 3985 opposite last page.

Adjustable containers which can be varied in length, width and height are subject of four-page folder. Uses of container for screens, sheets, bags, felts and other materials are depicted in pictures and text. Adjusta-Pak Folder — Signode Steel Strapping Company.

Check 3986 opposite last page.

Portable pneumatic unloader for use with Airslide cars is depicted with illustrations and text in Portallow Bul — Sprout, Waldron & Co., Inc.

Check 3987 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Lift-truck attachments which can be used to convert standard fork truck to front-end loader in less than 10 minutes are presented in six-page Shovel Cat — Allen Industrial Products, Inc.

Check 3988 opposite last page.

Tape-sealing system for new or multi-use corrugated cases is described in four-page Model M-10 Bul — Portland Division, Emhart Manufacturing Company.

Check 3989 opposite last page.

Fork truck with 2500 lb capacity is described in six-page color brochure. Battery-powered model is available with fork heights up to 130 inches. Bul SS-2215 — Industrial Truck Division, Clark Equipment Company.

Check 3990 opposite last page.

Isocyanates handling and storage requirements are detailed in 15-page brochure which explains best methods for unloading tank cars and tank trucks, handling drums, constructing storage tanks and transfer lines. Bul C-3 — National Aniline Division, Allied Chemical.

Check 3991 opposite last page.

All these advantages from selection to erection with pre-engineered units

EASY SELECTION from standardized Link-Belt components. Your Link-Belt sales engineer will help you select the right combination.

ON-THE-SITE QUOTATIONS by a trained sales engineer. He will prepare a prompt quotation on all components necessary for efficient operation.

LOW FIRST COST. Pre-engineered, shop-assembled components, prompt delivery, fast erection time—all result in lower initial costs.

LOW OPERATING COSTS. Due to rugged design, maintenance normally consists only of lubrication. More economical based on cost per ton handled.

QUICK DELIVERY. Pre-Bilt sectional belt conveyors are manufactured and shipped from one of nine plants located nearest your operations.

FAST, LOW-COST INSTALLATION. Simple construction facilitates field assembly, reducing time and costs of erection.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,193

LINK-BELT Pre-Bilt belt conveyors bring savings from the start

Speed, economical operation and dependability—conveying features required in every industry—are provided by Pre-Bilt Sectional Belt Conveyors. They stand up in the most rugged, full-time operations. And normally the only maintenance required is lubrication.

The same engineering design which has produced some of the world's outstanding conveyor systems is applied to Pre-Bilts. Standardized, shop-assembled components are selected to specifically fit your installation. Simple construction provides ease of handling and erection.

No other conveyor offers such rugged design and economy of operation in bulk materials handling. Call your nearby Link-Belt office for complete information. Or write for Catalog 2779, a new "Idea Book" for cutting costs with Link-Belt Pre-Bilt sectional belt conveyors.

LINK-BELT
BELT CONVEYOR EQUIPMENT

Check 3992 opposite last page.

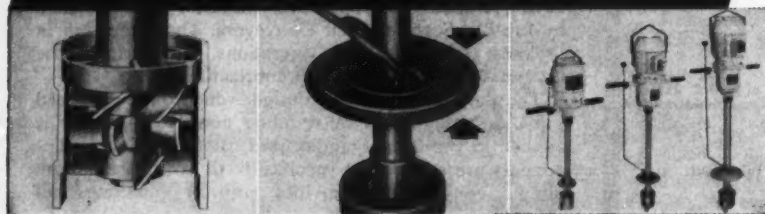
SHEAR-FLOW



Shear-Flow's high shear action produces finer, faster blending, dispersing and homogenizing. The new Model RL Shear-Flow portable mixer represents a major advance in mixer design. The new Hi-Shear Head consists of two rotating impellers and two stationary stators enclosed in a cylindrical housing. The fine clearance between impellers and stators results in rapid shearing action and a high degree of turbulence, resulting in a more complete reduction of agglomerates within the mixture.

- Greatly reduces mixing time
- Uniform circulation—no vortex
- Emulsifies immiscible liquids
- Controllable flow pattern
- Chemically inert seals
- Handles viscous materials with ease
- No operating torque

HAS A GOOD HEAD FOR BUSINESS



Close tolerances between impellers and stators promotes high shear for reduction and dispersion of material.

Adjustable deflector plate controls flow pattern for desired mixing action and air entrainment.

Three basic portable models for processing 1 to 250 gals. plus continuous mix units for high volume processing.

Write today for complete information on the Shear-Flow line of mixers.



GABB SPECIAL PRODUCTS INC.

Windsor Locks, Conn.

Check 3993 opposite last page.

Flemming Challenges CPI *From page 29*

mation. It would be my recommendation that this type of information be collated just as soon as possible, and the entire matter then be discussed with the scientific staff of the Food and Drug Administration, to determine what if anything further will be needed to effect suitable clearance as contemplated by the Law.

The completion of this part of the task would enable both the Food and Drug Administration and the industry to give full attention to the additives for which testing must still be completed and evaluated before next March.

Q. What provision should be made for natural products that may prove carcinogenic?

A. The law already deals with naturally occurring "poisonous or deleterious" substances (which would, of course, include carcinogens) in a sensible and practicable way. It provides that — "if the substance is not an added substance, [the food containing it] shall not be considered adulterated if the quantity of such substance in such food does not ordinarily render it injurious to health."

In the case of such naturally occurring substances, it may be that we can rely upon experience to show them "not ordinarily injurious to health," within the meaning of the law.

Let me say that if there is a real problem here, it has not yet been identified and crystallized to a point where we can recommend any different solution than this. But the law provides an entirely different — and much more strict — standard for added substances.

Q. Do you have an opinion on this? Some people have said that the petition procedure for obtaining approval of new products is too complex. If you agree, can anything be done to simplify it?

A. The petition procedure is much the same as that which has been found successful in the handling of new drugs since 1938, and pesticides since 1954. The only difference in the new-drug field is that there we have a private type of procedure with no publication in

the Federal Register, whereas the food-additive law is set up on a public basis.

It may be that additional experience will point the way to some streamlining of the procedures. Experience with new drugs and pesticides shows that the present procedure is not unwarrantedly burdensome.

Q. Why has there been a change of opinion on inclusion of the Delaney Clause in additives legislation? (from the time of FDA food-additives-hearing testimony)

A. The change of position resulted solely from a further crystallization and hardening of the scientific view, based on continually accumulating evidence that there is not now known any way to set a safe tolerance for a carcinogen.

This being true, we have concluded that the administration of the Law and public confidence in the safety of our foods will be best served by having the Law itself prohibit any attempt to establish tolerances for carcinogens.

However, we have recommended a change to provide for the use of a carcinogen in animal feeds where it could be shown that this did not have an adverse effect on the animal, and that none of the carcinogen would remain in or on the edible portions of the animal at time of slaughter.

Q. The crux of all the controversy on the Food Additives Amendment seems to be the provisions of the Delaney Clause in the Act. The fact there are no tolerance levels whatever for carcinogens is pointed to by some critics as unrealistic and unnecessary.

Do you feel that carcinogen tolerances, carefully and scientifically determined and consistently reevaluated in the light of new findings, might be a more workable and equally safe alternative?

A. This question contradicts what I have just said in reply to the last question—that, as of now, scientists do not know how to set a tolerance for a carcinogen.

If and when that situation changes to one where toler-

ances can be set, we would ask the Congress to modify the Law to give us the authority to set a tolerance.

Q. *There is some feeling on the part of scientists that the new Law will discourage process improvement and product development. True?*

A. This reaction is quite typical with any new law. The record shows that similar statements were made when the original Food and Drugs Act of 1906 was enacted, when the 1938 Act became law and when the Pesticide Chemicals Amendment took effect.

In the case of the 1938 law, one of the big points at issue was the New Drug Section. All of these fears failed to materialize and I see no reason why we should have a different result from the Food Additives Amendment.

I would like to predict that, just as in the case of the previous laws and amendments, industry will soon find itself unwilling to do without the protection afforded or

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FP Editor Milleville Replies to Flemming

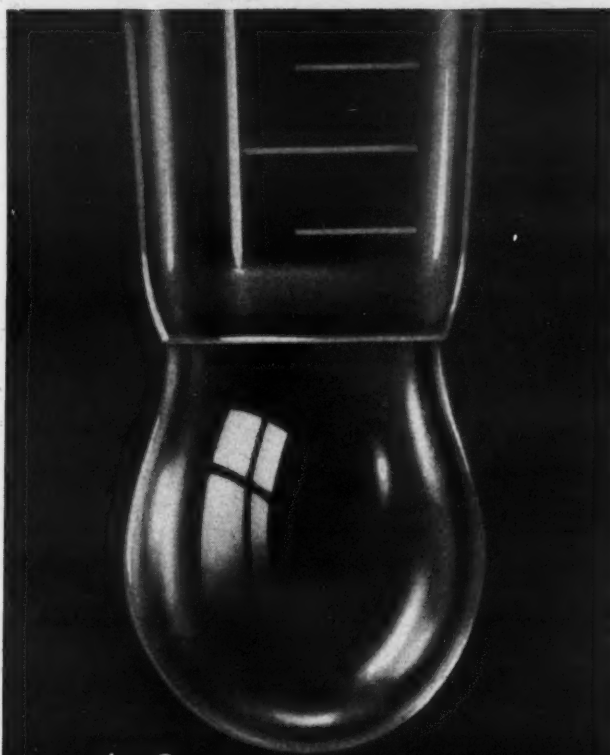
From page 28

that this Amendment was originally sponsored by the food industry, and that it was the wholehearted support of both the food and chemical industries in 1958 which finally secured its passage despite the last-minute addition of the Delaney Clause.

Industry accepted this last-minute addition of the Delaney Clause because it was assured that FDA would employ the rule of reason based on scientific judgment in the administration of the Clause. Flemming has made a shambles of this assurance.

There has come to be a difference of opinion of the way in which scientific questions under the Delaney Clause may best be administered.

Industry is fighting for legislation which will assure that government regulations of questions of carcinogenicity will be flexible enough to permit adaptation to advances in knowledge . . . and thus encourage scientific advances in nutrition and food technology.



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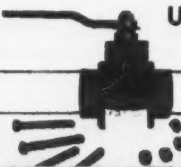
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Flemming Challenges

From page 111

without the good will and public confidence which enforcement of these laws engenders.

Q. Some industry scientists feel that, since they have run the tests on the effect of chemical additives on food, they should interpret the results. Would you care to comment on this?

A. Of course industry is entitled to interpret its test results and advise the Food and Drug Administration of its conclusions. These may be helpful to FDA scientists. But it would largely defeat the purpose of the law if the person regulated were allowed to make the final decision as to whether he had complied.

Q. How can smoked foods be considered safe, even though some of the absorbed smoked components have been found to induce cancer?

A. The question includes an assumption which I am not willing to make without more knowledge of all relevant scientific facts. If it is shown that the smoking of a food results in adding a proven carcinogen, it would seem clear that this would be prohibited. But I do not know that this is the case. ■

Enjoy's Plastics Push

From page 31

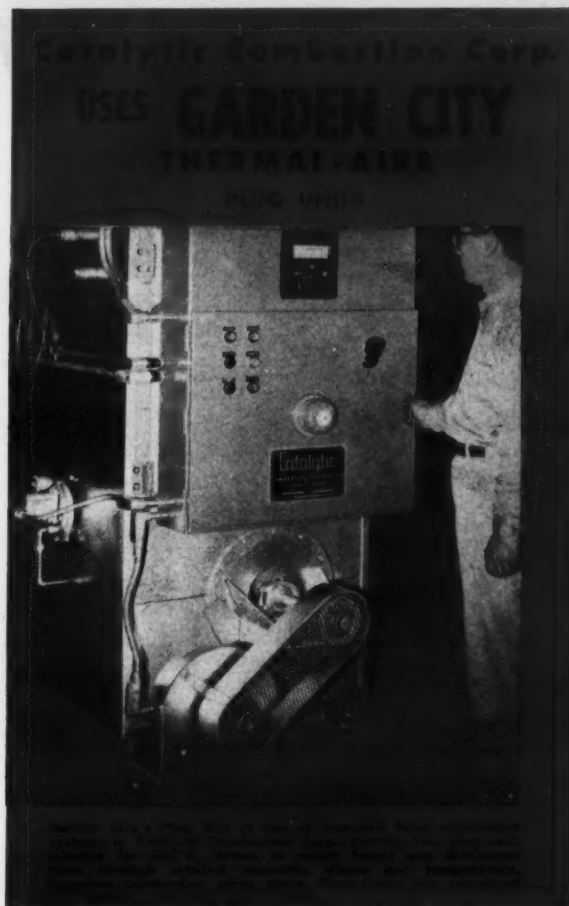
tern of product and customer tests had been run, and small quantities of product had begun their flow.

Once decision was reached three years ago to push ahead with the project, personnel were mobilized and trained.

As seen in the circular chart, an organization with cross-checks and balances ample for a long pull ahead into a wide variety of petrochemicals, including polyolefins, is provided.

Enjoy's plastics marketing unit was formally placed in the organization charts around the first of the year. By this time, however, nearly everyone was ready for the shift.

1958 was a decisive year in



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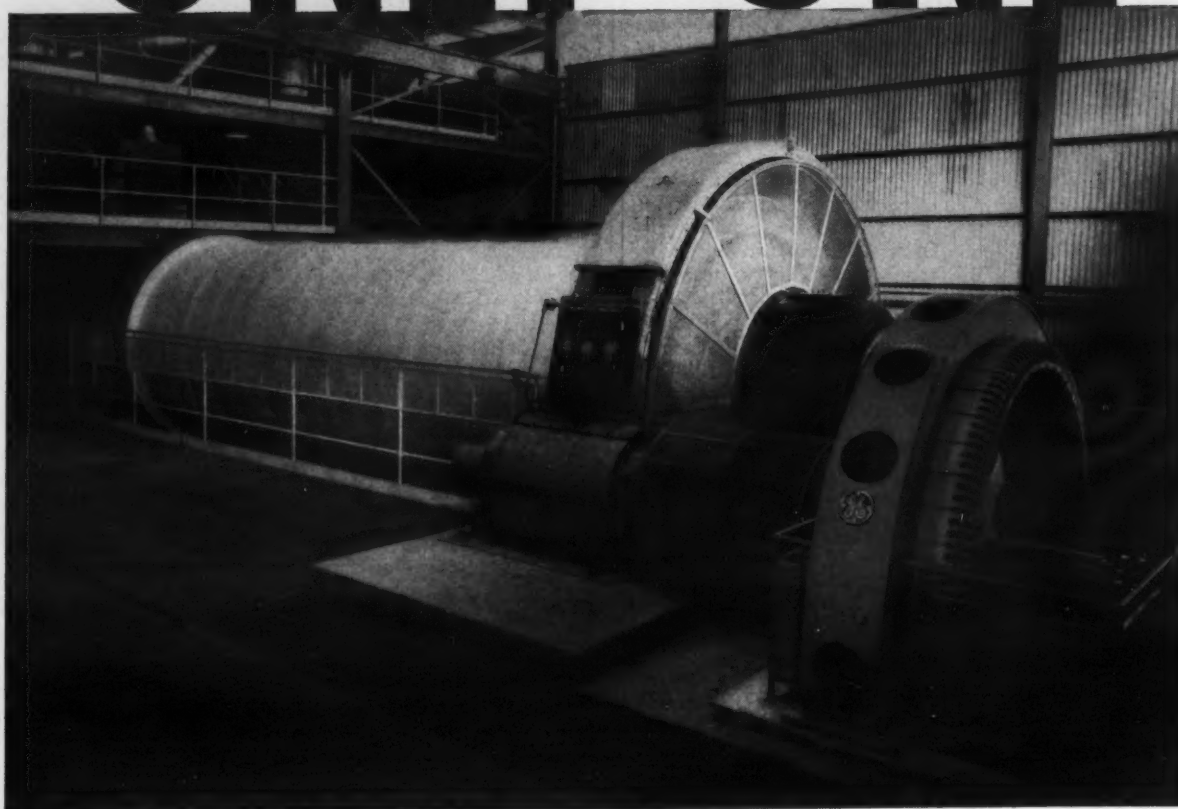
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Enjoy's Plastics Push

From preceding page

organizational changes. That year, John E. Wood III was elected Enjay president, after a career in the Chemical Products Division, which he headed since 1954. Wood holds a PhD in organic chemistry.

Wood's three key executives: Nelson of Sales, Green of New Products, and Dix of Products Management, are all chemical engineers.

The Plastics Division of Products Management—C. E. Farnsworth, Product Manager—will have a key role in Enjay's marketing of the new polymers and co-polymers, by providing all technical service and other sales backstopping functions as well as packaging, warehousing, and transportation of product.

Responsibility for these functions falls upon three men: Dave Hammel, as technical coordinator, heads technical service and information, product improvement and laboratory services. He is a former chemist.

Fred Phillips, manufacturing coordinator, sets plant forecasts, and supervises packaging, warehousing, and transportation. He was trained as a mechanical engineer.

Market coordination is handled by 23-year plastics industry veteran Carl Virgin, who makes sales forecasts, handles sales liaison, and turns out the variety of sales aids needed for communication with the plastics industry.

So far, Jersey Standard says entry into the plastics picture has cost \$30 million, \$15 million for the polyolefins plant. This is only part of the petrochemicals expenditures which have so far run about \$300 million for plants and equipment. Within the next two years, Jersey expects to spend "at least another \$100 million, a large portion of it overseas," according to executive v-p Dave Shepard. As to the domestic portion, Enjay's Wood reports a current investment rate of \$20 million/yr for new petrochemicals facilities and equipment, which within five years "may be upped to \$30 million."

For consumer-closer petrochemical products, it will pay to keep an eye on Enjay.

TMA 2

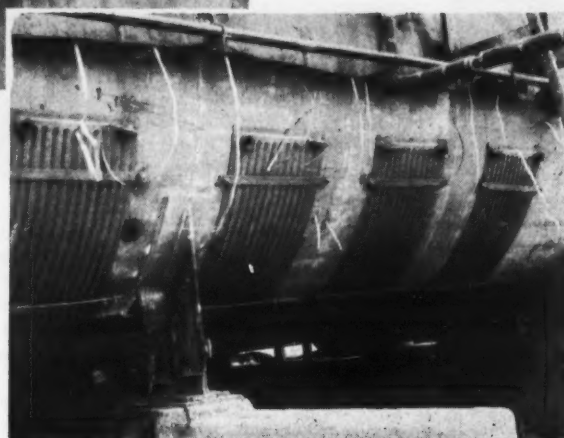
Check 3997 opposite last page.

cp PROCESSING EQUIPMENT



Heating JACKET (arrow) welded to lower portion of phthalic anhydride storage tank posed threat of contamination

Heating PANELS have averted the threat. After steam line connections were made, assembly was covered with two inches of insulation



Leak in tank heating jackets could contaminate product... so jackets were replaced with self-contained panels through which heating fluid circulates

SHERWIN CHASE, Supervisor

Phthalic Anhydride

Sherwin-Williams Company, Chicago, Illinois
with **CP STAFF**

Problem: Preventing contamination of phthalic anhydride during storage was a major cause of concern at the Chicago plant of Sherwin-Williams Company. Held in two jacketed, 8500-gal-capacity outdoor tanks, product had to be kept at a minimum of 266°F to remain liquid.

Experience had shown that the prevalent danger was possibility of corrosion destroying a welded seam or other interior surface of the steel tank. Heating vapor in the jackets would then leak into tank and contaminate its contents.

The storage tanks measure eight feet

in diameter by 19 feet long. Heating jackets consisted of four six-inch channels welded longitudinally to the outside lower portion of the tanks. Both vessels, of course, were fully insulated.

Solution: The jackets were chiseled off and replaced with compact, efficient heating panels. Ten single-embossed units, each measuring 22 by 59 inches, were fastened to the tank wall (five panels against each side). The units had previously been rolled and shaped to fit exact contour of tank.

Studs and supports were welded to the vessel. Panels were secured to tank walls by means of the studs. After being tightened in place, steam line connections were made and the entire assembly was covered with 2"-thick block insulation.

To next page

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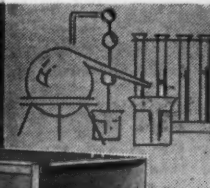
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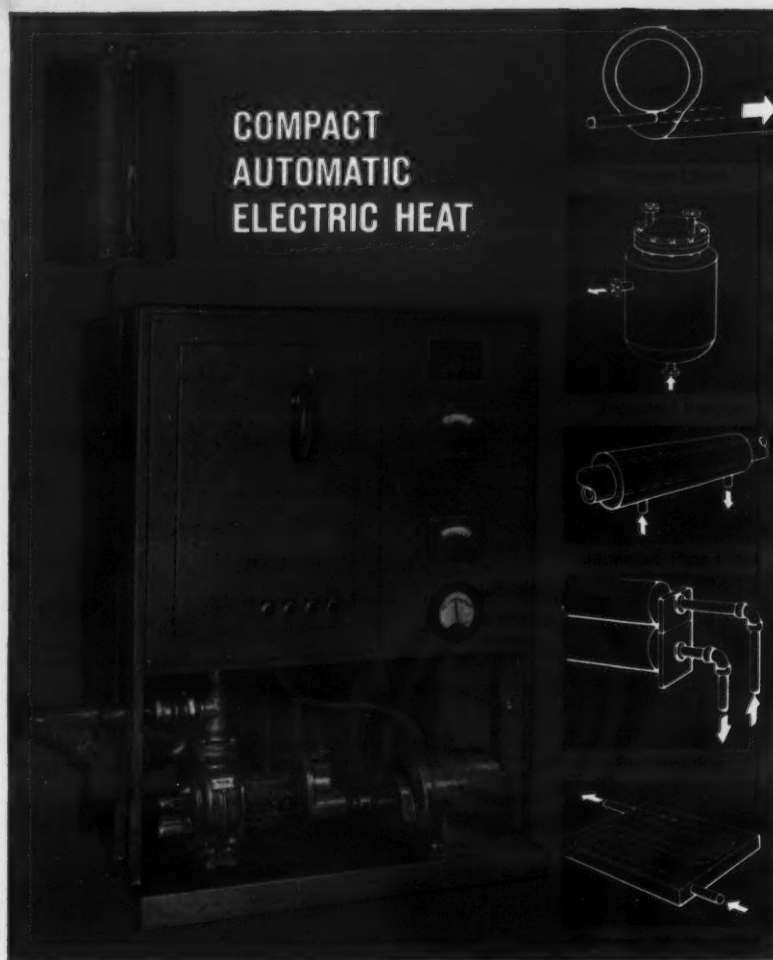
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Check 4000 opposite last page.

PROCESSING EQUIPMENT

Similar panels can take the place of coils, tubes or jackets — and may be used either for heating or cooling applications. Units consist of two metal sheets, seam-welded together, with either one or both sheets embossed to form the flow channels.

Pressures to 250 psi

Embossing and welding can be made for parallel, series or series-parallel flow as selected by user. Maximum suggested operating pressures vary from 70 to 250 psi depending upon whether embossing is single or double, and the kind of metal used. Units may be fabricated from wide variety of metals and alloys, including Monel and titanium.

Double-embossed panel has cross-sectional flow area of about 0.62 square inches per channel. Single-embossed unit has only one-half this flow area. Standard lengths vary from 23 to 143 inches. Widths are 12, 18 and 30 inches.

Results: The heating panels have successfully eliminated the possibility of the phthalic anhydride becoming contaminated by steam condensate or other fluid used for heating the product in the storage tanks. The arrangement also makes it possible to reuse the condensate without fear of its being contaminated and corroding the return lines.

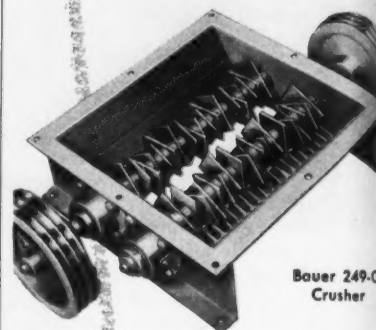
The panels are used on an around-the-clock basis, seven days per week. Units have required little, if any, maintenance. Operation has been so successful that Sherwin-Williams is using the panels for tank heating applications in other portions of the plant.

(Dean Panelcoils are manufactured by Dean Products, Inc., 1048 Dean St., Brooklyn 38, N. Y.)

Check 4001 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

break the lumps of compacted chemicals

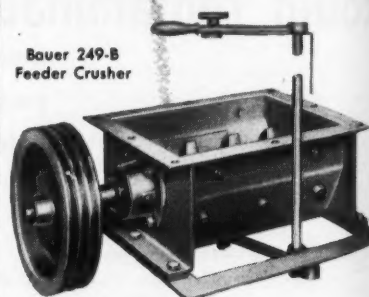


Bauer 249-C
Crusher

For breaking up compacted chemicals, such as potash and charcoal, or similar industrial materials, Bauer crushers can provide the uniformity of size you want.

These units can be used independently or with Bauer attrition mills, hammer mills, breakers, granulators or fiberizers to speed the processing of virtually any type of material.

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Bauer 249-B
Feeder Crusher

THE BAUER BROS. CO.
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Bauer

Check 4002 opposite last page.

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

Portable dust collector weighs only 90 lb, handles 450 cfm

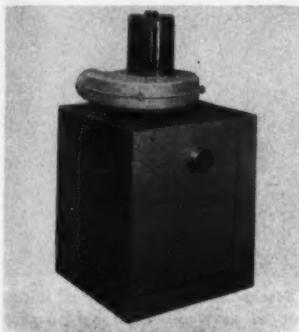
Self-contained unit has no exposed moving parts

Uses: Removing dust in small working areas or from dust-creating machinery.

Features: Dust collector is a complete self-contained unit measuring only 19 x 20 x 23". Machine's light weight (90 lb) permits it to be easily moved to different locations. Capacity ranges from 245 to 455 cfm, depending upon size and number of hose connections.

Description: Unit collects both coarse and fine particles. Dust-laden air is drawn into cabinet by means of hose connected to hoods serving the dust-creating area or machine. Fine dust particles are trapped in fireproof, washable aluminum filters. Heavy particles fall into pan below filters.

Dust collector has no exposed moving parts. Cast



Low-cost, dust collector removes both coarse and fine particles, measures only 19 x 20 x 23"

aluminum fan is powered by 1/2-hp motor. Baked enamel steel cabinet has front access door to facilitate removal of dust pan and filters.

Unit is available with one or two 3" hose connections or one 4" connection. Dust collector costs \$199.50. Four-wheel dolly is available at extra cost.

(Model D-5 Dust-Master is product of Cincinnati Fan & Ventilator Co., 3548 Montgomery Road, Cincinnati 7, Ohio.)

Check 4003 opposite last page.

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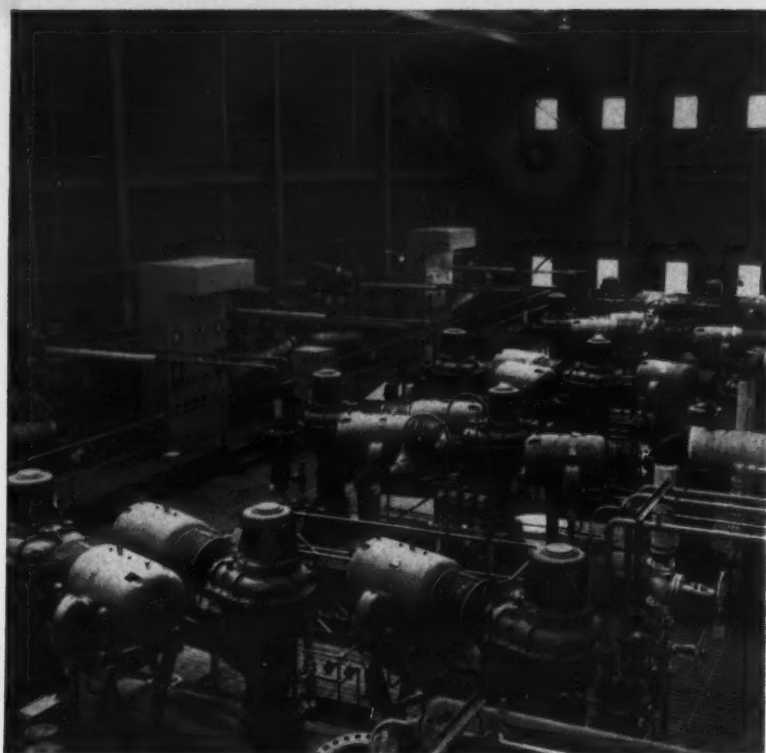
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Check 4004 opposite last page.



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Check 4005 opposite last page.

PROCESSING EQUIPMENT

Commercial zone refining makes silicon ultrapure

Merck & Co. gets impurities down to one part in 10 billion

Ultrapur silicon — containing as little as one part per ten billion foreign matter — is being turned out in commercial quantities at the Cherokee plant of the Electronic Chemicals Division of Merck & Co., Inc. Located in Danville, Pa., the installation produces near-perfect crystals on a 24-hr-per-day, seven-day-per-week basis. The silicon is used to manufacture the tiny transistors and rectifiers that play such an important part in miniature electronic devices.

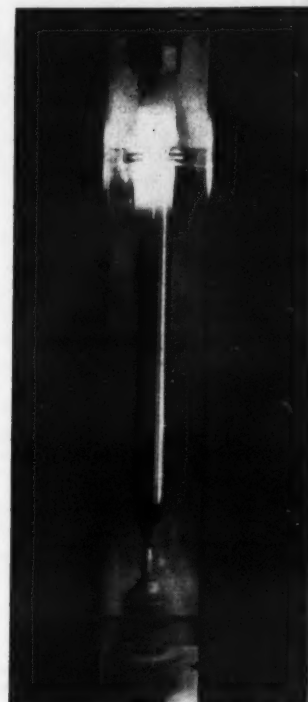
To obtain this amazing purity, the plant uses a technique known as "floating zone refining". Operated at extremely low pressure (in order of 10^{-5} mm Hg) the process permits crystals to grow in a liquid melt which is suspended in "space" and thus is not contaminated as it might be if it were in a container.

The method works particularly well with silicon because it has a relatively low density and possesses a high surface tension when in the liquid state.

Use Induction Heating

In floating zone refining, an ingot of silicon is first supported in a vertical position between two chucks. A narrow zone of silicon is then melted by means of induction heating using an r.f. generator. The molten zone can be moved through the entire length of the rotating ingot by manipulating the r.f. coil.

Most of the impurities present (mainly in groups three and five of the periodic table) in the silicon have lower freezing points than the silicon and can flow to the end of the ingot. The number of



Closeup of rotating ingot of silicon. Molten zone produced by induction heating coil is readily visible. Number of passes made by the coil determines final degree of purification.

passes made with the coil determines final degree of purification.

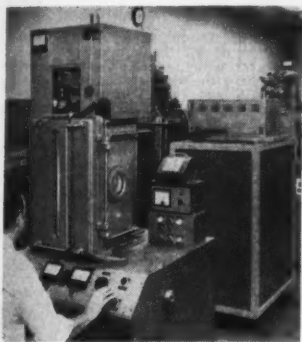
Reliable Vacuum Apparatus

Specially-designed vacuum chambers maintain the low-pressure conditions continuously and uniformly throughout the refining cycle, which lasts several hours. The vacuum causes many of the impurities to be carried off by evaporation. It also sweeps away silicon vapor which surrounds the molten zone during processing.

With the exception of boron,

which cannot be easily removed by physical means, all of the electrically-active impurities are separated from the silicon.

Size of the purified silicon crystal is controlled as follows. A single seed is used to start with. Careful manipulation permits seed to grow into a large crystal. Diameter is controlled by adjusting the r.f. power and moving ends of the ingot so as to stretch or



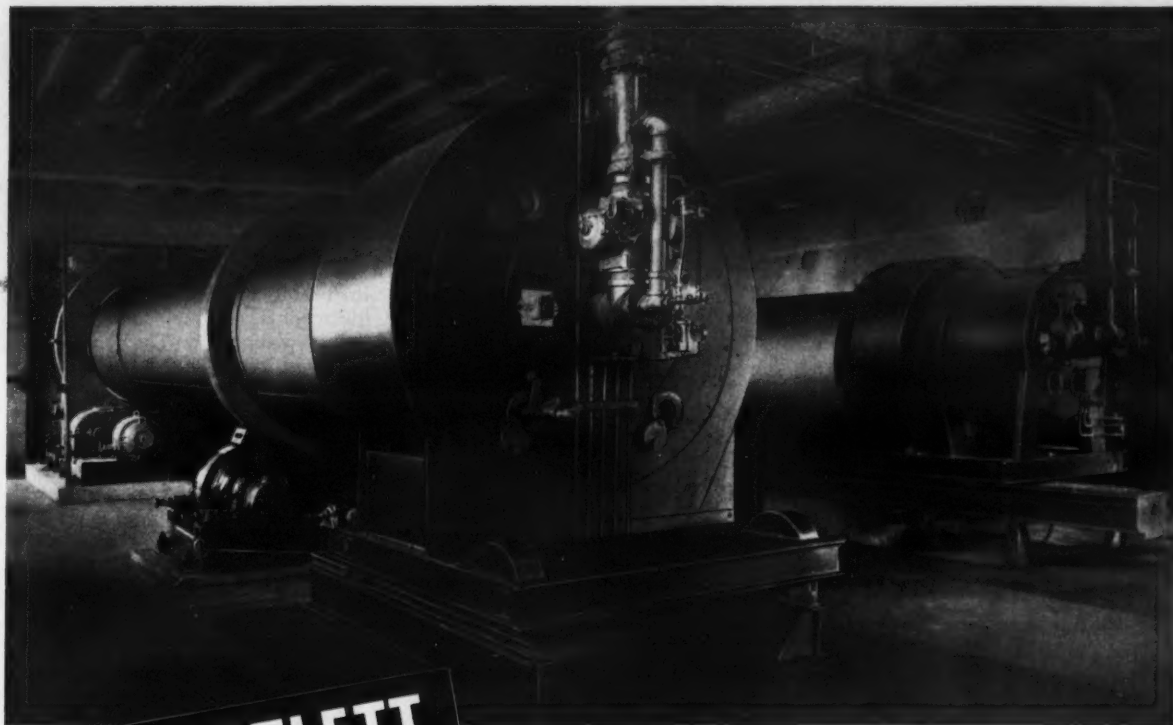
Apparatus used for floating zone refining at Merck & Co. Pumping system located in console furnishes vacuum equivalent to ten-millionth of an atmosphere

compress the molten zone. Merck produces crystals having diameters ranging from 23 to 25 mm. The diameter varies less than 0.05 cm along crystal's entire length.

Some Impurities Go Back In

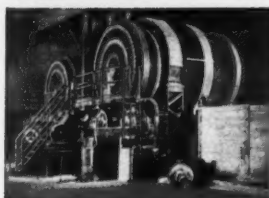
The electrical properties of silicon, like other semi-conductors, are extremely dependent on the purity of the material — or, more exactly, on its impurity content which can be accurately controlled. Absolutely pure silicon is a nonconductor, with a resistivity of 300,000 ohm-cm. To make silicon conductive, it must contain small amounts of other materials which yield one or more free electrons that are available for conducting current.

Merck performs this "contamination" operation after the zone refining process has been completed. The pure silicon crystal is "doped" with

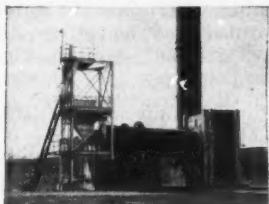


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Bulletin No. 118 gives full details. Send for a copy Today.

Check 4006 opposite last page.

Cut Perfect Gaskets

Easily with the ALLPAX Gasket Cutter

If you can draw circles with a compass you can cut perfect gaskets in seconds with this handy kit. Just set the blade for the desired thickness, set the pivot post at the desired diameter, and a smooth swing of the cutter gives you a clean, accurate gasket . . . from a 1/4 inch bolt hole to a 60 inch outside cut. Larger diameters can be cut with additional extension arms.

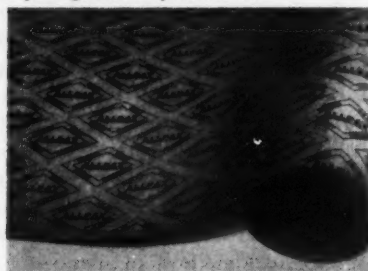


ALLPAX Gasket Cutter is packaged in this strong steel case.

The ALLPAX Gasket Cutter has become standard equipment in thousands of plants where expensive "down time" is kept at a minimum by cutting new gaskets when and where they are needed. Available in five styles to cut maximum diameters of 12, 24, 36, 48, 60 inches.

Use the following Allpax gasket materials for your gasket requirements:

- 400—Compressed Asbestos Sheet
- 500—Superheat Compressed Asbestos Sheet
- 600—Vegetable Fiber Oil Proof Sheet
- 700—Red Rubber Sheet
- 750—Black Rubber Sheet
- 800—Diaphragm Sheet
- 850—Cloth-Inserted Sheet



ALLPAX

"The Packing that Packs All"

SEND FOR OUR NEW CATALOG — TODAY!

A complete line of packing, tools, gasket materials
Distributors in principal cities

THE ALLPAX COMPANY, INC.

160 Jefferson Ave., Mamaroneck, N. Y.

CANADIAN DISTRIBUTORS: Albion Asbestos Packings Ltd. Montreal 8, Quebec

Check 4007 opposite last page.

PROCESSING EQUIPMENT

the desired impurity to the desired concentration.

At present the most exacting commercial requirements are for silicon with minimum resistivity of 1000 ohm-cm, "p" type (doped with boron). The Cherokee plant is more than able to meet these requirements with its zone refining equipment. The company is regularly supplying crystals with resistivity up to 10,000 ohm-cm. It has produced some as high as 50,000 ohm-cm.

(High-vacuum equipment used in the process was supplied by F. J. Stokes Corporation, 5500 Tabor Road, Philadelphia 20, Pa.)

Check 4008 opposite last page.

Up to 7000 cfm handled by entrainment separator

Uses: Removing entrained hydrocarbons and organic liquids from compressed air or gases.

Features: Units have capacities up to 7000 cfm at pressures to 200 psi.

Description: Equipment uses system of porous membranes. Entrained liquid in the form of small droplets and mist are coalesced into large drops for removal by the media. Any remaining liquid is processed and removed by wire demister section.

Gas containing entrained liquid enters through side opening at top of separator. Liquid exits through bottom. Purified gas leaves through port located about halfway down column.

(Further information about Coalescer-Demister may be obtained from Selas Corporation of America, Dresher, Pa.)

Check 4009 opposite last page.

Unit holds temperature of continuous mixer within $\pm 2^\circ\text{F}$

Continuous mixers can now be controlled within plus or minus 2°F by use of a recently developed heating and cooling unit. Adapted for manufac-

What's News in Mixing?

by

COWLES

DISSOLVERS

"50,000" Europeans Can't Be Wrong, Either!

Actually there probably aren't 50,000 users of mixing equipment in Europe, all together. But it's a big market for Cowles Dissolvers, just the same, with Cowles users increasing rapidly. Here are a few examples of performance —

1. Two major European TiO_2 producers comment that of all the equipment which they have ever tested, the Cowles Dissolver has given them the best results, often obtaining a 7-1/2 and even a clear 8 on the N.S., or Hegman scale, (0-8).

2. A famous ink manufacturer advises that by predispersing with the Cowles Dissolver, they are able to save several passes on their 3 roller mills as follows: Milori Blue, formerly 6 passes — now 3 passes; Organic Red, formerly 8 passes — now 4 passes; Carbon Black, formerly 3 passes — now 1 pass.

3. In one of Europe's largest paper plants, a Cowles Dissolver deaerates heavy paper coating in 20 minutes, reducing the volume from 1200 liters to approximately 1000 liters.

4. A manufacturer of latex emulsions and oil base finishes reports over 42% production increase with Cowles Dissolvers for high speed dispersions. Batch-to-batch uniformity is improved substantially.

5. A major paint manufacturer produces 3,200 liters of ready ship's oil paint every hour and 20 minutes with his 40 HP 720-VHV Super Series Cowles.

6. In another leading plant a 30 HP Model 720 VH finishes 2 ton of acrylic emulsion paint in 40 minutes.

Far from being wrong, more and more European processors say they're RIGHT in choosing Cowles Dissolvers for hundreds of chemical, food, paint and similar products.

You, too, can get greater production in less space at less cost, with Cowles equipment.

Let us prove it in your plant, at our risk.

Write us today about your problem.

MOREHOUSE-COWLES, INC.

1130 San Fernando Road
Los Angeles 68, Calif.



Representatives in Principal Cities.
Convenient Lease and Time-Payment Plans

Please send me information on use of Cowles Dissolver in processing (product)

Name Title

Firm

Address

City Zone State

619

Check 4010 opposite last page.

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

turer's 4" Ko-Kneader continuous mixer, unit can also control the temperature of an extruder, if one is used in conjunction with the mixer. It is able to add heat to some zones and remove it from others.

Water Heats and Cools

Temperature control is accomplished by heating or cooling pressurized water circulating through jackets of the mixer. The heating and cooling unit has three circuits. Two provide controlled heat for the circulating medium. The other handles cold water. Each of the heating circuits can handle nine gpm and supply maximum of 15,000 Btu/hr.

One of the heat circuits is connected to the mixer screw



Heating and cooling unit provides continuous mixer with system for accurate temperature control

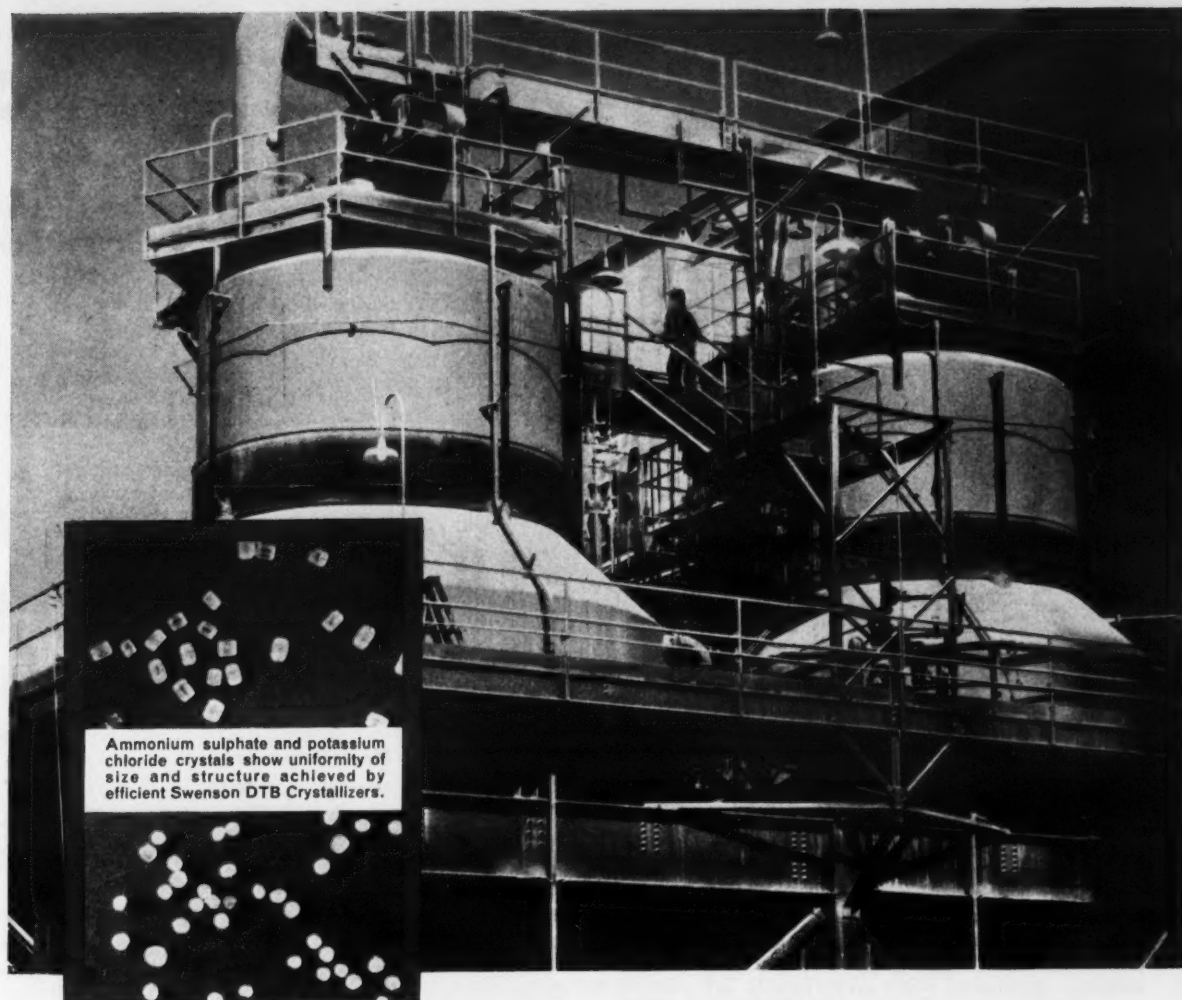
and discharge end of mixer barrel. The other serves feed end of mixer barrel and die, or extruder barrel and screw. Cold water circuit supplies mixer hopper, and if required, extruder barrel and screw.

Heat is provided by passing 200 psi steam through heater's tube bundle, with the medium circulated outside the tubes. Pressurized water at up to 360°F can be handled on outside of tubes. With slight modification, unit may use oil as circulating medium. This would provide maximum temperature of 600°F, or total heat to mixer from both circuits of 60,000 Btu per hr.

A 12-kw electric immersion heater can be used in place of a tube bundle, if necessary.

(Heating and cooling unit for continuous mixers is product of Chemical Machinery Division of Baker Perkins Inc., 1000 Hess, Saginaw, Mich.)

Check 4011 opposite last page.



Ammonium sulphate and potassium chloride crystals show uniformity of size and structure achieved by efficient Swenson DTB Crystallizers.

23 FOOT DIAMETER DTB CRYSTALLIZERS PRODUCE BETTER SALTS

Potassium chloride production is in high gear at American Potash and Chemical Corporation of Trona, California. Their two new Swenson DTB Crystallizers (draft-tube, baffle-type), the largest ever built, produce potassium chloride from concentrated brine at a remarkably high production rate. The new equipment produces large, uniform crystals of premium value—does it with low wall salting, and long operating cycles, because of its simplified basic design. Versatile DTB Crystallizers are readily adaptable to the production of many different salts. Their demonstrated performance in terms of crystal size and uniformity is convincing manufacturers everywhere to turn to DTB Crystallizers. Call Swenson—leader in the field—for details.

FREE BOOKLET . . . Tour the nation's leading processing plants serviced by Whiting/Swenson equipment for cost-cutting ideas! Write for "Processing Profiles" today! Swenson Evaporator Company, 15667 Lathrop Avenue, Harvey, Illinois



PROVED ENGINEERING FOR THE PROCESS INDUSTRIES SINCE 1889

SWENSON

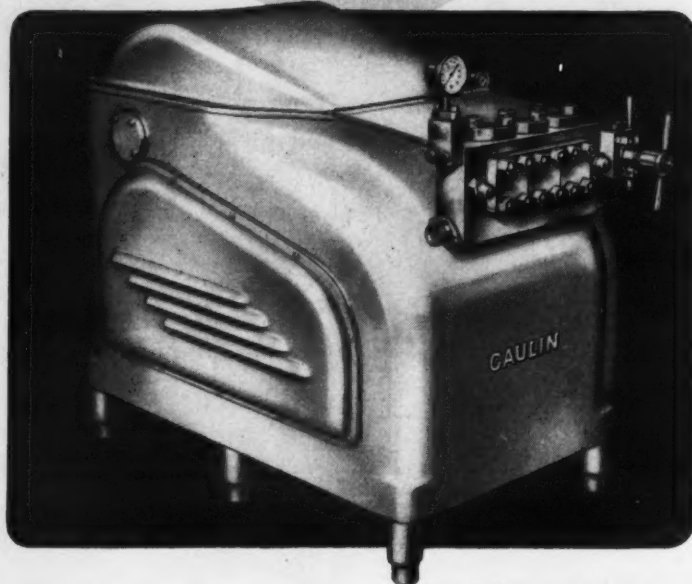


WHITING—MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES; FOUNDRY, AND RAILROAD EQUIPMENT

Check 4012 opposite last page.

Gaulin Homogenizers Plus G.T.A.*

**Unlock the Secret to
Cost Savings in Blending,
Dispersing or Emulsifying**



Gaulin Homogenizers and Dispersers reduce ingredients down to their ultimate particle size . . . disperse them evenly. They make uniformly finer emulsions of maximum stability. Also produce fine uniform dispersions with exceptionally low rise in temperature. They give you control of particle size and viscosity . . . improve texture . . . stop color separation.

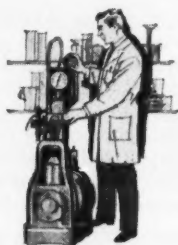
*Gaulin Technical Assistance provides free technical data, experienced advice and laboratory analysis. Take advantage of G.T.A. Write for bulletins: Homogenizers H-55, Sub-Micron Dispersers SMD-55, Colloid Mills C-57.



GTA Bulletins



Technical Assistance



Laboratory Analysis



Try Particle Control in Your Plant . . . Rent a Gaulin Laboratory Homogenizer for Only \$75.00 Per Month! This versatile machine reduces ingredients in your product to ultimate particle size. Minimum sample one pint; Capacity 15 GPH; Pressures up to 8000 psi. Rental costs applicable against purchase price. Write for Bulletin LH-55.



World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps; dispersers, homogenizers and colloid mills.

Check 4013 opposite last page.

PROCESSING EQUIPMENT

**Quick-opening coupling
cuts filter downtime,
boosts production**

Many plants can reduce filter downtime and boost production by installing V-band couplings on the filter tank covers. Only one nut and bolt is required to securely seal the unit — as compared to dozen or more bolts frequently used. The device also gives a compact, streamlined appearance to filters. Couplings are available in wide range of sizes and configurations.

(Marman V-band couplings are product of Aeroquip Corporation, Marman Division, 11214 Exposition Boulevard, Los Angeles, California.)

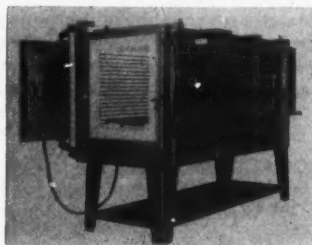
Check 4014 opposite last page.

**Electric furnace
can be used with
or without fans**

Uses: Heat treating, glass annealing, and other high temperature operations.

Features: With fans removed, furnace can be operated at 300 to 2300°F. Use of fans and forced convection permits accurate temperature control between 150 to 1875°F.

Description: Electric furnaces are available in various sizes. Heating elements are supported by rigid specially-designed holders. Low mass



Zone gradient control in electric furnace is achieved by multiple circuits

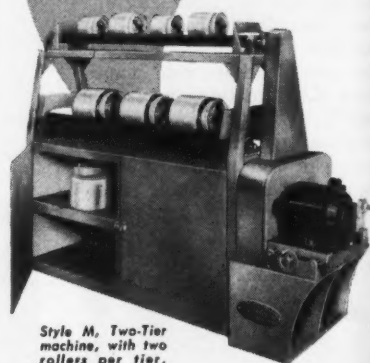
characteristics of elements keeps overshoot and undershoot of temperature control to minimum.

Input controllers accurately maintain uniform heat. Zone gradient control operates by

**MULTIPLE BATCH
GRINDING
WITH VERSATILE**

abbé

JAR ROLLING MACHINES



Style M, Two-Tier machine, with two rollers per tier, mounted on built-in storage cabinet.

Multiple batches of similar or different materials can be economically ground, pulverized or mixed simultaneously on a versatile Abbé Jar Rolling Machine.

Jars, bottles or containers of different sizes can be used at one time. Each jar can be removed after its full grinding or mixing cycle has been completed—without stopping the machine.

Modern, rugged Abbé Jar Rolling Machines are available to handle single or parallel rows of jars, and in double or triple tiers for processing as many jars as required. Standard porcelain or steel jars range in size from 1 quart to 6 gallons. Built-in storage cabinets on tiered machines are optional.

Write for NEW
Abbé Jar Rolling
Machine Catalog 79



abbé ENGINEERING CO.

620E GRAYBAR BLDG., NEW YORK 17, N. Y.

Designers and Manufacturers of
Ball, Pebble and Jar Mills • Pulverizers
Sifters • Cutters • Mixers

Check 4015 opposite last page.

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

multiple circuits. Each has its own input controller. Gradients are indicated by pyrometer and thermocouples located within the zones.

(Dyna-Trol furnaces are product of L and L Manufacturing Co., 804 Mulberry St., Upland, Chester, Pa.)

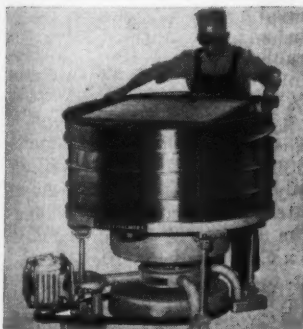
Check 4016 opposite last page.

Gyratory screen is easy to install, dismantle, clean

Uses: Sizing dry, corrosive or abrasive products in chemical, food and pharmaceutical industries.

Features: Screen deck has high strength and is easy to disassemble. Lay-on type seals need no fasteners or adhesives.

Description: Redesigned stainless-steel, gyratory screen provides up to 35 sq ft of screening area in 16 sq ft floor space. Unit's spherical roller



No special tools are needed to dismantle gyratory screen separator. Removing external rods permits lifting off cover and screen decks in matter of minutes

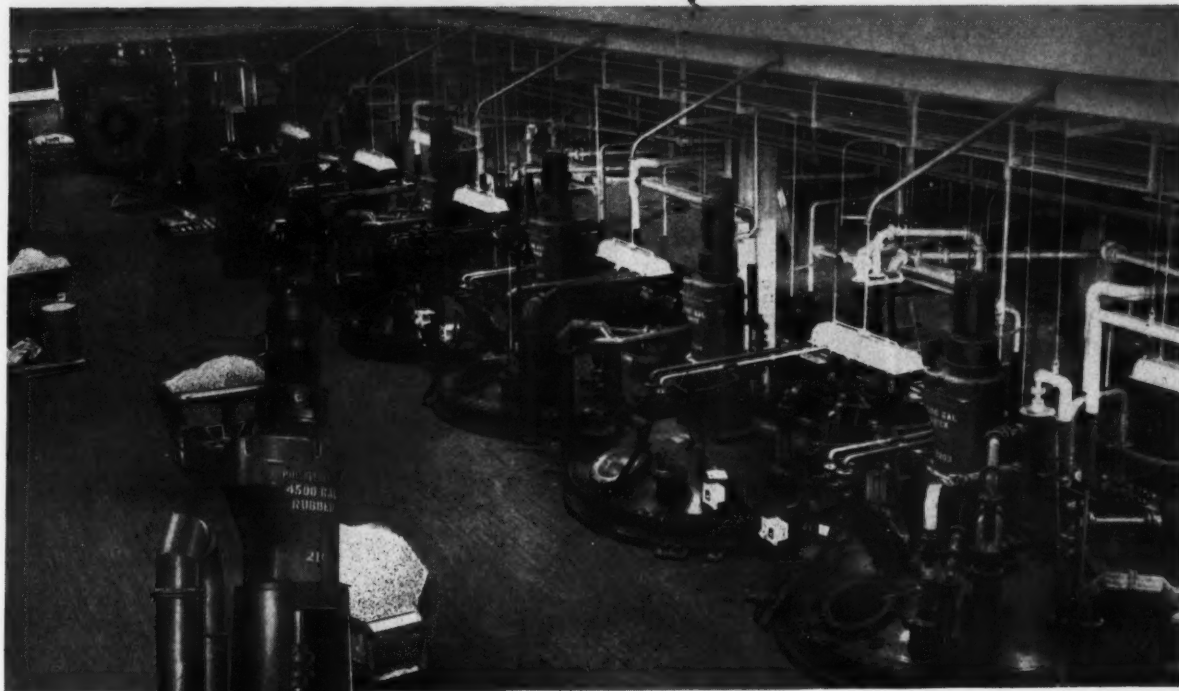
bearings have hydraulic pressure fittings for grease lubricating and are located for easy accessibility.

Machines are available with stacks of three to seven screen decks. With larger units, as many as three or four products can be separated at one time. Feed sizes that can be handled range from 200 mesh to $\frac{1}{4}$ ".

(Model SS-2 gyratory screen is product of Allis-Chalmers Manufacturing Company, Milwaukee 1, Wis.)

Check 4017 opposite last page.

YOU GET MORE...WHEN IT'S A PHILADELPHIA MIXER!



YOU GET MORE because Philadelphia Mixers are huskier. All components are heavier duty, higher capacity.

YOU GET MORE because the integrated design of Philadelphia Mixer drive assemblies makes optimum use of the high quality and extra capacity of all components. Result: Improved mixer performance . . . longer mixer life . . . reduced maintenance costs.

CASE IN POINT: Hundreds of Philadelphia Mixers installed at Toms River-Cincinnati Chemical Corpora-

tion, major producer of dyes, have produced solid, over-the-years savings through rock bottom maintenance costs and 100% availability. This includes mixers with horizontal motor drives that solve headroom problems . . . mixers with vertical motor drives that simplify tank top piping arrangements . . . mixers with variable speed drives that meet changing process needs . . . and special mixers with push button controlled impeller raising and lowering devices.

When you buy Philadelphia Mixers you get still another advantage . . . precision ground gearing in the mixer drives. This is a major advance in gear accuracy that means less wear, less vibration and reduced sound levels.

Look into all the advantages of Philadelphia Mixers. Six standard models, 1 to 250 HP. Special units to 500 HP. Horizontal or vertical motor drive. Mechanical seal or packed stuffing box. Paddle or turbine type impellers. For complete data, write for catalog A-19.

philadelphia mixers

PHILADELPHIA GEAR CORPORATION

King of Prussia (Suburban Philadelphia), Pennsylvania

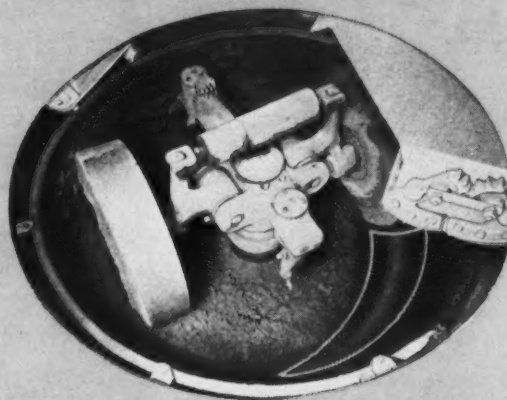
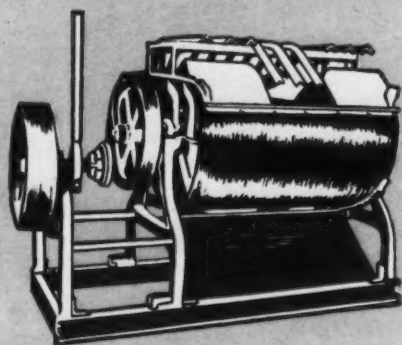
Offices in all Principal Cities • Virginia Gear & Machine Corp., Lynchburg, Va.

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

Check 4018 opposite last page.

MIX-MULLER®

MEANS CONTROLLED DISPERSION



You can MIX without a muller; but can you MULL without mullers?

A study in semantics . . .

The muller is a very specialized piece of mixing equipment. It is specifically designed for use where an intensive, intimate blend of dry/solid, solid/solid, or wetted/solid materials is needed.

Trying to mull, or achieve controlled dispersion, in a machine not equipped with MULLER WHEELS is like flying a tailless kite on a windy day . . . you may get it off the ground, but you have no control.

The fact that you can control dispersion through the use of muller wheels is the reason why at least three manufacturers have specialized in this art for about half a century. Today, the need for controlled dispersion has become increasingly evident to processors as well as to mixer manufacturers . . . everybody's got a muller. So, if you need controlled

dispersion, it will pay you to remember that *mulling* is more than a matter of semantics. What was a *mixer* last year . . . is not necessarily a *muller* this year.

Simpson Mix-Muller Division has devoted a 12-page bulletin to the subject. It's called the **HANDBOOK ON MULLING**. Why not write for a copy? Or, see it in the current *Chemical Engineering Catalog*.



Presented in the interests of maintaining truthful presentation of—and purposeful application for, the mulling principle of mixing by:

SIMPSON MIX-MULLER DIVISION

NATIONAL ENGINEERING COMPANY

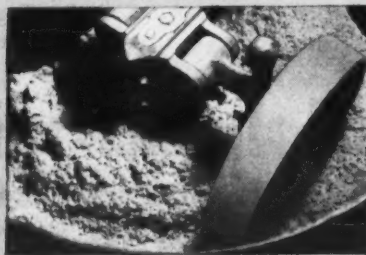
640 Machinery Hall Bldg. • Chicago, Illinois

P1460

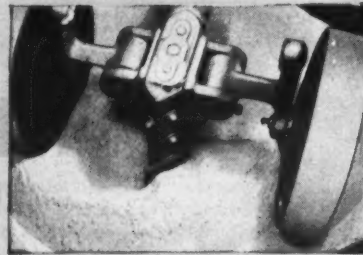
NOTHING MULLS LIKE A MULLER



GOING: Mix is wetted, dispersion of coating media begins as lumps begin to form.



GOING: Smearing, spatulate action breaks up lumps as mulling action disperses moisture.



GONE: Agglomerates almost gone as blending nears completion. Mix is homogeneous, thorough.

Check 4019 opposite last page.

Compact wet scrubber has 99% efficiency, no moving parts

10,000 cfm unit measures only 5 x 5 x 19' high

Uses: Removing dust, fumes and odors from air and gas streams.

Features: Wet-type scrubber has efficiency of up to 99%, handling materials as fine as fly ash. Unit has no moving parts.

Description: Scrubbing action is achieved by vortexing the gas flow through series of chambers. Each chamber is designed to produce a swirling action so that gas is scrubbed with water and wetted dust particles are centrifuged out of the gas stream. Gas passes through venturi-shaped throats between chambers.

Constant or intermittent removal of sludge can be accomplished either manually, hydraulically or mechanically. Unit's back pressure is only 3 1/2" water.

Scrubbers are available in capacities ranging from 1000 to 60,000 cfm. Smallest unit is only 5' high, including a moisture extractor mounted on top. The 10,000 cfm unit measures 5 x 5 x 19' high. Dust loadings up to 15 to 20 grains per cu ft can be handled efficiently.

(Hydro-Volute scrubber is development of the Johnson-March Corporation, Philadelphia, Pa.)

Check 4020 opposite last page.



"She gave me quite a start!"

NEW LITERATURE Processing Equipment

Technical data on three high-velocity dryers are cited in four-page bulletin. Air velocities range from 15,000 to 20,000 fpm and temperatures up to 800°F and beyond in some applications. Bul HV-501 — J. O. Ross Engineering, Division of Midland-Ross Corporation.

Check 4021 opposite last page.

Advantages of electric heat transfer systems for thermal liquids are outlined in four-page bulletin. Illustration of a typical package unit including flow schematic is shown. Bul 108—Gerin Manufacturing Company, Inc.

Check 4022 opposite last page.

Improved design "RJ" dust filter is discussed in eight-page bulletin. Unit has only three moving parts and can handle fine, coarse, abrasive or non-abrasive dusts. Bul G-30—The Day Company.

Check 4023 opposite last page.

Pilot plant filters are subject of eight-page brochure. Units are designed for vacuum filter applications and include necessary accessories. Brochure "Pilot Plant Filters" — Industrial Filter Division, Komline-Sanderson Engineering Corporation.

Check 4024 opposite last page.

Evaporators — both single and multiple effect—are discussed in 28-page bulletin. Design and function of various units used to process solvents and other chemical solutions are covered. Bul "Evaporators"—Chicago Bridge & Iron Company.

Check 4025 opposite last page.

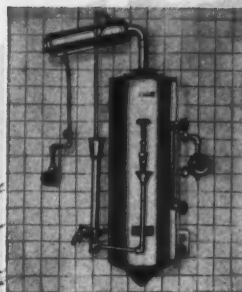
How to select electro magnetic pulleys or non-electric ceramic type units are explained in eight-page catalog. Literature also describes ceramic material which has high magnetic field intensity. Cat C-2000—Dings Magnetic Separator Company.

Check 4026 opposite last page.

Continuous jet cooker for preparing high-solids content textile finishes is covered in bulletin. Unit is adaptable to variety of formulations. It helps produce uniform viscosity pastes which permit better size pickup with even shadings of colored fabrics and savings in mix requirements. Jet Cooker Bul — A. E. Staley Manufacturing Co.

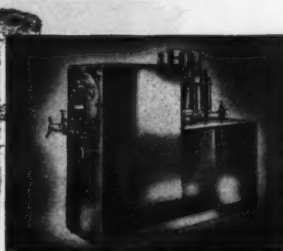
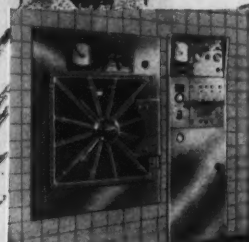
Check 4027 opposite last page.

WATER STILLS
Capacities from $\frac{1}{2}$ to 500 gal./hr.
Steam, Electric or Gas Heat.

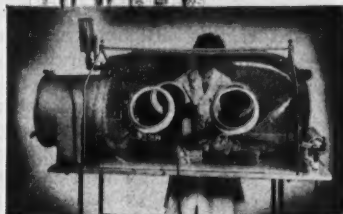


STERILIZERS

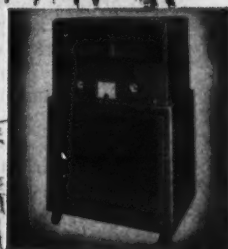
Pressure Steam, Gas-Steam,
and Gas. Chambers 16" x 16" x 24"
to 60" x 66" x 120".



BIOGEN • continuous culture apparatus
For batch or continuous culture of pure
microorganisms in controlled conditions.



DRY BOX
Flexible film chamber.
Efficient, economical,
easy to work with.



FREEZE DRY APPARATUS
Laboratory, pilot plant and
production models. Used for the
preservation and concentration
of labile substances.

GERM FREE LIFE APPARATUS
Complete service, including
flexible operating,
rearing and transfer chamber.



TALK MICROBIOLOGICAL EQUIPMENT...

*and you have to talk
to American Sterilizer!*

● Here at Amsco, sterilization is still of prime concern. However, to parallel the great strides of modern biological technology, we've developed a number of highly specialized microbiological devices—all designed to do their job better with less personnel time and attention and at a cost well within practical limits.

If you've a problem in this area, a letter to our Scientific and Industrial Department may lead to its economical resolution.

SCIENTIFIC AND INDUSTRIAL DEPARTMENT



**AMERICAN
STERILIZER**
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*World's largest designer and manufacturer of Sterilizers,
Operating Tables, Lights and related biological equipment*

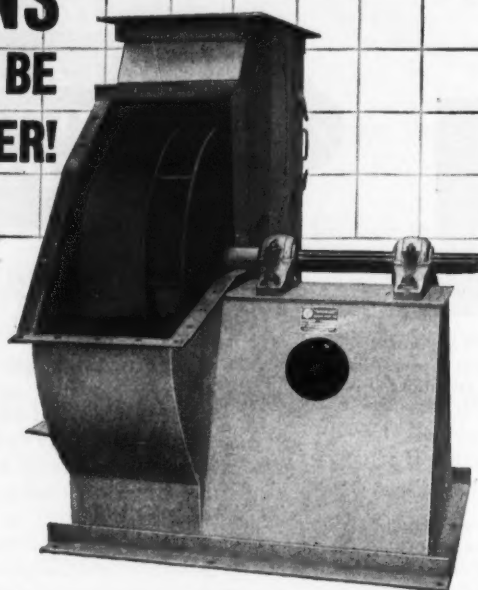
Check 4028 opposite last page.

**CORROSIVE GASES
SHORTENING FAN LIFE ?**



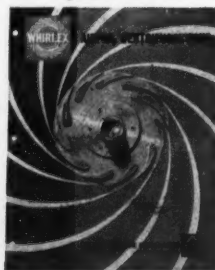
**SPECIAL
DESIGN**

**RUBBER COATED
FANS
CAN BE
THE ANSWER!**



Whirlex Special Design Fans and Dust Collectors offer a wide variety of special coatings and linings. Metal life can be extended many times even under severe corrosive conditions with proper application of special linings.

WHIRLEX offers many unique fan design features. Write for fan bulletin #FD11.



Fly Ash Arrestor CORPORATION

205 North 1st Street — Birmingham, Alabama
1355 Market Street San Francisco 3, Calif. 420 Lexington Avenue New York 17, N. Y.

Dust Collectors ■ Induced Draft Fans ■ Forced Draft Fans
Exhaust Fans ■ Self Supporting Stacks ■ Duct Work



**PLANT ENGINEERING
MAINTENANCE & SAFETY**
... electrical & mechanical developments

Quickened pumping pace jumps PVAc production 50%

Progressing-cavity pumps at H. B. Fuller have surmounted cleaning-downtime and product-viscosity obstacles to be key factor in processing PVAc to emulsion half again as rapidly as before

BERNARD MONHOLLON

Plant Manager
H. B. Fuller Company
St. Bernard, Ohio

PROBLEM: Sagging PVAc-emulsion production rate at H. B. Fuller Company's plant in St. Bernard, Ohio, was laid directly at feet of three pumps which in spite of various corrective attempts had proven incapable of operating at a satisfactory production rate without excessive downtime.

In this process, polyvinyl acetate is processed into emulsion form for sale as adhesive alone or as base for other additives. The thick and somewhat corrosive material ranges from four to six pH and has normal viscosity of 1600 cp. Three initial pump installations proved unsatisfactory as follows:

1) A piston pump was installed at one location to transfer a colloid solution. This is crucial spot in processing operation, since pump was required to operate 24 hr/day, including weekends.

First piston pump tried could not do job. Supplier then recommended larger motor. As soon as switch was flipped, driving arm snapped in two. When arm was replaced by more solid model, first ON cycle tore up gear box.

Finally, larger piston was

recommended. This met with success. However, solution was transferred at such slow speeds that another four-hr period was lost every day from predetermined optimum time schedule.

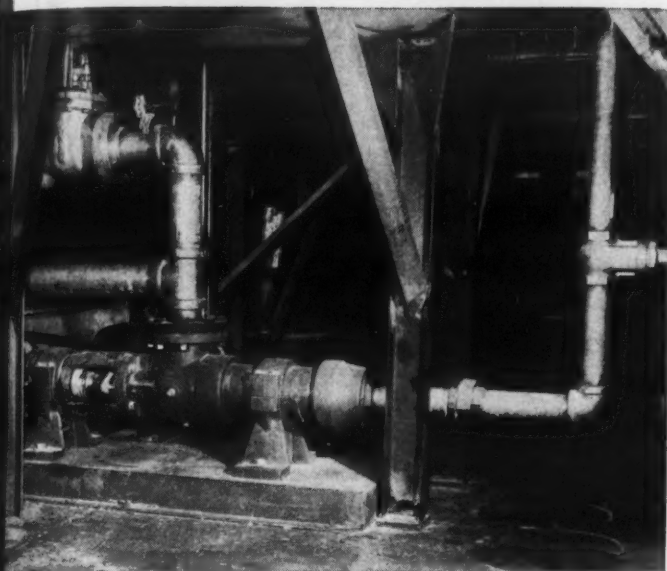
2) A positive-displacement gear pump was placed on transfer duty, pumping emulsion at 80°C. Gears produced agitation or shearing action which caused emulsion coagulation. This had to be screened out.

Also, pump was down for repairs several times per day — locked up by fine particles which quickly dried on teeth whenever unit was off. Skin-like coating thus formed required 20 min to remove on each occasion.

3) At another location on processing circuit, a centrifugal pump operated without downtime, but slowly. Each of the many batches of emulsion made daily was held up at this point for 60 min.

Solution: Three progressing-cavity pumps were purchased for the installations outlined above. A small model with stainless-steel rotor was first specified for application (1) — on colloid line. Success here led to purchase of a larger version as replacement for gear pump in transfer-duty application (2). Good results in this case logically instigated order for third progressing-

Check 4029 opposite last page.



This progressing-cavity pump (one of five utilized in plant) transfers processed PVAc emulsion from all five of Fuller's storage tanks to tank trucks at a rear dock. Pump lifts thick and corrosive product 13' in so doing. Tanks have total capacity of 17,000 gal; pump can handle 3400 gal in 90 min

cavity pump to take over from centrifugal unit in use (3).

Progressing-cavity pumps perform in manner similar to precision screw conveyors. Each incorporates helical rotor turning within double-helical stator. Cavities thus formed between rotor and stator move continuously toward discharge port. This results in positive displacement and uniform flow with low internal velocities.

Results: For three applications outlined in **Problem** section above, results were as follows:

1) **Pump on colloid line** has run continuously with only one time-out for brief repair. Its successful functioning boosted production rate by 20%.

2) **Progressing-cavity unit** in transfer duty performed without agitation of emulsion. It has also proved simple to flush clean. Except for one instance (when cleaning was neglected) it has not been inoperative since installation. Improvement in this case represents a 10% production-rate increase.

3) **Centrifugal-pump** replacement also hiked production rate by handling in 15 min what old pump had done in 60 min.

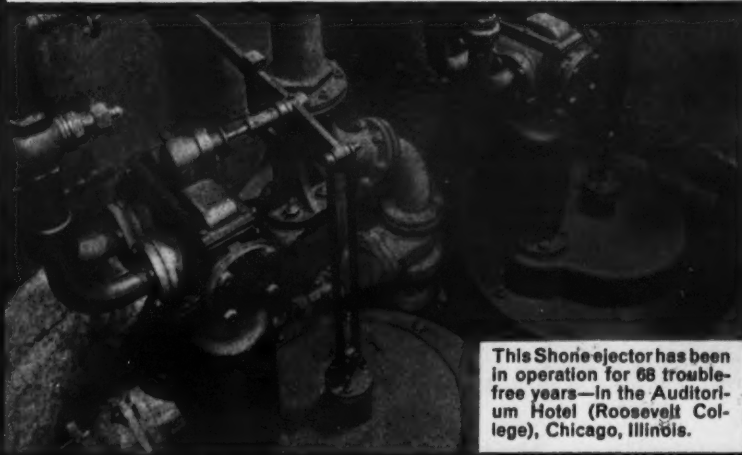
There are now five such progressing-cavity pumps in operation in plant. Their combined efforts have boosted production rate by approximately 50%.

(Progressing-cavity pumps are product of Moyno Pump Division, Robbins & Meyers, Inc., 1934 Clark Blvd., Springfield, Ohio.)

Check 4030 opposite last page.

Convenient tables, formulas having to do with electrical maintenance are incorporated in 116-page booklet which is actually reprinted Chapter 23 of "Maintenance Hints Handbook." Included in information tabulated in booklet are conversion tables, formulas, trigonometric functions, various circuit formulas, graphical symbols for electrical diagrams (an extensive section), and other tables and data. Copies of "Convenient Tables and Formulas" may be obtained for 50¢ each from Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.

for pumping domestic and industrial wastes...



This Shore ejector has been in operation for 68 trouble-free years—in the Auditorium Hotel (Roosevelt College), Chicago, Illinois.

YEOMANS pneumatic ejectors cut service costs because

THERE'S NOTHING TO WEAR OUT

- NO ROTATING PUMP PARTS
- NO AIRTIGHT FLOATS
- NO HIGH-SPEED SHAFTS OR BEARINGS

With Yeomans pneumatic ejectors, maintenance costs are 50% to 75% lower than with the best centrifugal pumps. The secret? Simplicity of design. Yeomans pneumatic ejectors are built to give you decades of trouble-free service—in fact, they will outlast your system.

They're recommended for low gallonages. Even the smallest Yeomans ejector will pass solids up to the size of the inlet and discharge valves... minimum of four inches. No danger of clogging.

They're safer, and completely sanitary. Fully enclosed, hermetically sealed. Dangerous hydrogen sulphide gas is never released.

Yeomans manufactures both centrifugal pumps and pneumatic ejectors, but recommends the ejector where extreme dependability is required. Among the seven models and more than 100 sizes there is a pneumatic ejector that will exactly fill your needs.

Manufacturers of: pumps for drainage • sewage • condensation return • water supply and circulation • equipment for treatment of domestic and industrial wastes.

YEOMANS

YEOMANS, 2003-5 N. Ruby Street, Melrose Park, Illinois

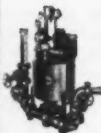
Please send me literature on the pneumatic ejectors I have checked.



The Shore ☐

name _____

company _____



The Packex ☐

street _____

The Expelsor ☐

city _____ zone _____ state _____

E-5907

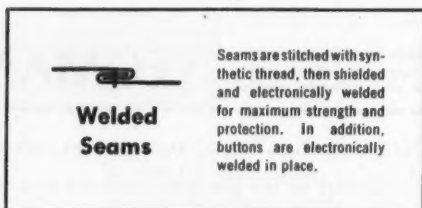
Check 4031 opposite last page.

**Keeps your men dry and comfortable
... come hail or high water!**



Light, flexible North PVC wet-weather clothing

For head-to-toe protection against wind, rain and sleet, outfit your men in North PVC foul-weather gear by Jomac. It's rugged as all get-out: coated on both sides, with all points of strain reinforced and all seams completely sealed by electronic welding. Yet it's light and flexible... and the jackets have set-in sleeve design and generous cut that allow full freedom of motion. It's safer: comes in a bright "safety" yellow for maximum visibility. And it lasts: will not crack, flake or peel, in use or in storage... extremely resistant to abrasion and snagging... wonderfully easy to wash. Write for literature!



Also ask about our complete line of North PVC coated gloves and chemical-resistant clothing

JOMAC

JOMAC Inc., Dept. N
Philadelphia 38, Pennsylvania

"Jomac Sells Quality... and Quality Sells Jomac!"

Check 4032 opposite last page.

ENGINEERING & SAFETY

**Coat bare 1700°F surfaces
in 18 colorful ways**

Uses: Color-coding or complete finishing of metal.

Typical applications include heat-transmission lines, traps, stacks, condensers, etc.

Features: Coatings can be applied to items subjected to temperatures as high as 1700°F. They are available in 18 colors.

Description: Heat-resistant coatings incorporate combination of non-leafing aluminum and metallic pigment. Non-leafing particles remain equally distributed and in constant suspension with pigment throughout coating vehicle. This results in virtual fusion of paint with hot metal surfaces.

Finish produced is resistant to moisture, corrosion, mild acids and alkalies and industrial fumes. Coatings are available in one-qt, one-gal and five-gal cans.

(Heat-Rem H-170 coatings are product of Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio.)

Check 4033 opposite last page.

Permanently pliable seals formed with adhesive

Uses: Bonding glass, metals, masonry or wood to virtually any surface.

Features: Compounds form permanently pliable seals.

Description: Sealant compound is based on Thiokol free-flowing liquid-polysulfide polymers. Water-tight bond formed resists acids, alkalis and solvents. Typical cured properties of black sealant (carbon-black accelerator) at 75°F after aging eight days are as follows:

Hardness, Shore A	25 ± 25
Shrinkage	—
Max elongation	800
Practical elongation	300
Tensile strength	140
Peel back adhesion	25

(E-bond 1007 sealant is specified in E-Bond 1007 Data Sheet—International Epoxy Corp., Box A-931, 501 N.E. 33rd St., Ft. Lauderdale, Fla.)

Check 4034 opposite last page.



ADVANCE PNEUMATIC EYE-BATH BOTTLE

**ALWAYS IMMEDIATELY
ACCESSIBLE FOR
FLUSHING DANGEROUS
SUBSTANCES
FROM THE EYE**

For flushing chemicals or foreign matter. Simple to clean, unbreakable and easy to use in any position. Can be kept right on the person and in accessible places around the plant.



PATENT PENDING

ADVANCE SEAMLESS FINGER GUARDS

**PREVENTS FINGER CUTS
PROTECTS FINGERS ALREADY CUT**

- Worn comfortably over light bandage
- Shields finger from painful contact
- Does not render finger useless in the manner of heavy bandages
- Easily removed to allow washing of hands and easily replaced
- Open and closed-end models
- Absorbent cotton lining
- One size fits all fingers, men & ladies

PLANTS IN . . .
DETROIT
CHICAGO
TOLEDO
ROME, GEORGIA

Write for free catalog

ADVANCE GLOVE MFG. CO.
918 W. LAFAYETTE BLVD., DETROIT 26, MICHIGAN

Check 4035 opposite last page.

Babbitt Adjustable SPROCKET RIM with Chain Guide CHANGES THAT DANGER ZONE TO A SAFETY ZONE



The distance between the floor of your plant and your overhead valves is a DANGER ZONE when piled up boxes or even ladders are used to reach the valves. Turn it into a SAFETY ZONE — equip your overhead valves with Babbitt Adjustable Sprocket Rims with Chain Guides.

- They simplify pipe layout.
- They fit any size valve wheel.
- They are easy to install and operate.
- They operate any valve from the floor.
- They save time and money.
- The first cost is the only cost (no maintenance).
- They are packed completely assembled (one to a carton), with easy-to-follow instructions.
- A hot-galvanized rust proof chain is available for all sizes.

Babbitt Adjustable Sprocket Rims with Chain Guide are carried in stock by most mill supply houses. If your supplier does not carry them, contact us direct.

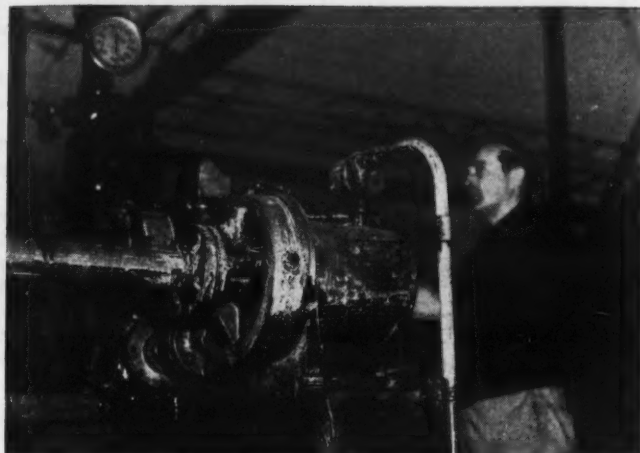
Babbitt STEAM SPECIALTY CO.

14 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

Check 4036 opposite last page.

CHEMICAL PROCESSING

PLANT ENGINEERING MAINTENANCE & SAFETY



In two years of operation, sealless canned pump has performed satisfactorily without maintenance except for routine bearing checks

Tiring of ballooning maintenance costs caused by recurring need for repacking leaky stuffing box of pump handling hydrocarbon-resin polymer oil, Neville Chemical shipped around for a new unit. Outcome:

Dangerous, wasteful resin leakage halted by sealless 'canned' pump

L. J. SITOMER
Chief Engineer

Neville Chemical Company
Neville Island, Pittsburgh, Pa.

PROBLEM: Pump stuffing-box leakage of hydrocarbon-resin polymer oil, in addition to wasting product, created fire and explosion hazard at Neville Chemical Company's facilities on Neville Island in Pittsburgh, Pennsylvania.

The pump was used to transfer product from process to storage. Stuffing box had to be repacked every 30 days. While alleviating problem somewhat, this solution pushed maintenance costs to an undesirable level.

Solution: A sealless "canned" pump was installed. Pump and motor are single hermetically sealed unit. Rotor, shaft and impeller form one rotating assembly. Rotor and stator

are completely enclosed, or "canned", inside non-magnetic alloy sleeves. This is done because portion of pumped fluid circulates through motor section to cool motor and lubricate bearings.

Canned-pump model utilized in this application operates at 50 gpm. It carries UL label of Class I, Group D service for both pump and motor.

Results: Pump has been operating for over two years without leakage. Product waste and fire and explosion hazard have thus been eliminated. During this period, only maintenance necessary has been occasional routine bearing inspections. These have not required replacement to date.

(Sealless canned pump is product of Chempump Division, Fostoria Corporation, Huntingdon Valley, Pa.)

Check 4037 opposite last page.

WHATEVER THE BREATHING HAZARD



**YOU'RE SAFE
WITH SCOTT EQUIPMENT**

Scott Sling-Pak Model 6000-B4A

When seconds count, reach for the Scott Sling-Pak. This model is the fastest piece of emergency equipment made. Ideal for fast, safe entrance into hazardous atmospheres. Cylinder holds enough pure breathing air for 15 minutes of hard work. Breathing protection at lowest cost.



Scott Air-Pak Model 6000-A2MS

For dangerous jobs of longer duration. Safe, comfortable breathing protection for a minimum of 30 minutes at extreme exertion. Bureau of Mines Approval No. 1308.



Scott Demand Respirators

Designed especially to provide breathing protection in atmospheres not immediately dangerous to life and from which the wearer can escape without breathing equipment. Cylinder models and plant air-supply models available. Bureau of Mines Approval No. 1924.

Scottoramic Mask

Provides picture-window vision in all directions for greater safety.



Missiles and Space Vehicles

Military and civilian installations throughout the world, handling exotic fuels and chemicals, are depending on Scott Protective Breathing Equipment to solve their respiratory problems.



SCOTT AVIATION CORPORATION

242 ERIE STREET • LANCASTER, N. Y.

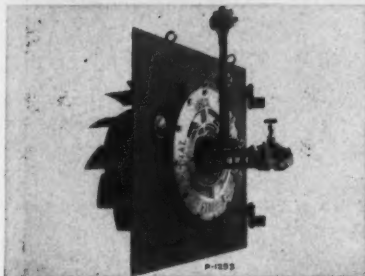
Canada: Safety Supply Co., Toronto — Branches in Principal Cities
Export: Southern Oxygen Co., 250 West 57th Street, New York 19, N. Y.

Check 4038 opposite last page.



ENGINEERING NEWS

NATIONAL AIROIL BURNER CO., INC. • 1284 E. Sedgley Ave. • Philadelphia 34, Pa.



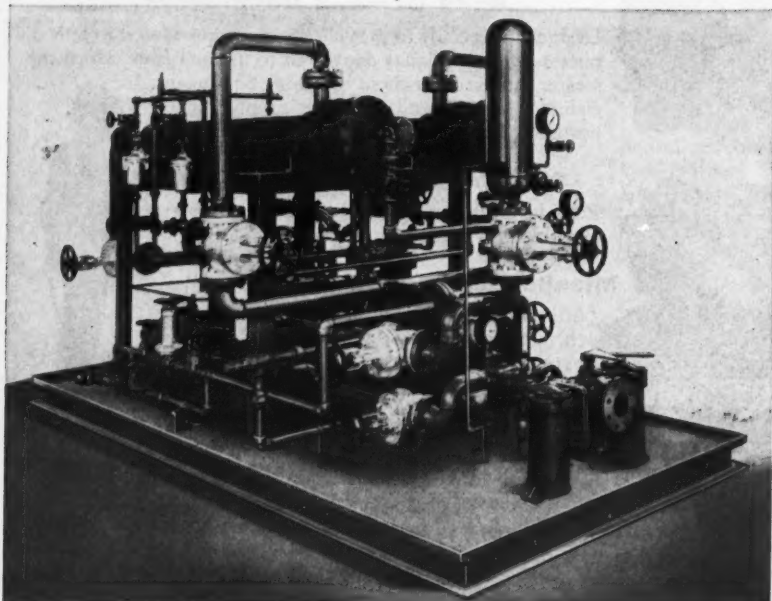
Have You Investigated National Airoil Universal Register Units?

These efficient members of the National Airoil family of quality products are available in a wide range of models including the swing-type shown above.

This particular unit can be furnished with gas burners, ring or cylindrical type, and/or oil burners.

All vanes are variable independently of each other, and reversible from left to right turbulence (or vice versa) as a unit. The integral damper disc permits closing-off each individual burner tile to prevent air leakage on shut-down.

Engineering data on other National Airoil Universal Register Units from 60 to 500 gph are available upon request. Write for Bulletin 51A.



Here's a Reliable Way to Prepare Heavy Fuel Oil for Combustion

If your heating problem involves the preparation of heavy fuel oil for combustion, you'll want to investigate the advantages of National Airoil Fuel Oil Pumping and Heating Units.

For example, these reliable, efficient units provide these advantages:

- even oil pressure and temperature
- valving easily understood by operators
- designed for a minimum pressure drop
- ease of maintenance
- space saving
- shipped complete ready for service connections
- less costly than on-the-job assembly

National Airoil Fuel Oil Pumping and Heating Units are available in single or duplex units, from 2 to 100 gpm in standard or special models.

Bulletin 40 contains the facts. May we send you a copy?



Do You Have These National Airoil Technical Bulletins In Your Library?

Whatever your industrial heating problem, you'll find a wealth of helpful information in these technical bulletins. Write for any or all of them today.



BULLETIN No. 40. FUEL OIL PUMPING AND HEATING UNITS

16 pgs. Here's the answer to problems involving preparation of heavy fuel oil for combustion. Single and duplex units, from 2 to 100 gpm in standard or special models.



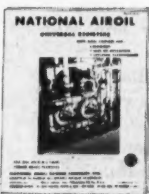
BULLETIN No. 26. AUTOMATIC PACKAGED FIRING UNITS

4 pgs. Steam atomizing automatic firing units for oil and/or gas fuels. Standard unit capacities — from 200 to 830 boiler horsepower (7,200 to 30,000 lbs. of steam per hour). Larger units for special needs.



BULLETIN No. 25. DUAL STAGE OIL BURNERS

4 pgs. Data points out advantages when both mechanical and steam atomizing principles are incorporated in a single oil burner. 3 standard sizes are shown.



BULLETIN No. 51A. UNIVERSAL REGISTER UNITS

4 pgs. Data offered on full line of these quality National Airoil products with capacities ranging from 60 to 500 gph.



BULLETIN No. 21. STEAM ATOMIZING OIL BURNERS

16 pgs. Describes "SA" Burner for use where steam or compressed air is available for firing many types of industrial process furnaces. 5 sizes have rated capacities from 10 gph to 725 gph.

ENGINEERING & SAFETY

Ceiling-substitute role played by insulation of aluminum foil

Insulation doesn't require any extra supports

Uses: Ceiling insulation wherever no permanent ceiling has yet been installed.

Features: Insulation serves as ceiling itself. Use of it does not require additional support such as backer board, lath stripping and wire.

Description: Aluminum-foil reflective insulation consists



Ceiling insulation consists of aluminum-foil layers which form reflective air spaces to reflect radiant heat, block heat by convection and hold conduction to minimum

of foil layers which reflect 97% of all radiant heat and block heat by convection. Layers from reflective air spaces which hold conduction to minimum. Also, insulation incorporates vapor-proof backing for condensation protection.

(Alfol insulation is product of Reflectal Corporation, Subsidiary of Borg-Warner Corp., 200 S. Michigan Ave., Chicago 4, Illinois.)

Check 4040 opposite last page.

Heavy duty coils for steam, steam distribution and hot water are highlighted in 44-page bulletin which discusses coil selection and gives specific sample problems. Bul B-1518 — Industrial Division, American-Standard.

Check 4041 opposite last page.

Check 4039 opposite last page.

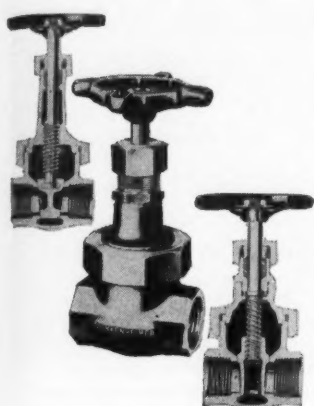
Valve trio is designed for low maintenance and safety

Union-bonnet gate valves are for 125-150 psi

Uses: Valving applications in chemical processing.

Features: Valves are safe and relatively maintenance-free due to three design elements — union bonnet, reinforced body and cylindrical body-neck section.

Description: Union-bonnet bronze gate valves are available in three variations — with double-wedge disc and



Union-bonnet bronze gate valves are available in three variations — with double-wedge disc and rising stem, with solid-wedge disc and rising stem and with single-wedge disc and non-rising stem

rising stem (3125), with solid-wedge disc and rising stem (3127) and with single-wedge disc and non-rising stem (3129).

Valves each incorporate chamfered opening inside top of body. This provides working room for positioning discs on guide when assembling valve. Long pipe threads in valve body permit tight valve-to-pipe joint. They are suitable for applications in 125- to 150 psi steam-pressure range.

(Gate valves 3125, 3127 and 3129 are products of Lunkenheimer Company, Beckman & Waverly Avenues, Cincinnati 14, Ohio.)

Check 4042 opposite last page.



USED TO THINK EVERY STEAM TRAP LEAKED STEAM.



THEN I FOUND ONE THAT DIDN'T, BUT IT WOULDN'T VENT AIR.



FOUND ONE THAT VENTED AIR, BUT IT NEEDED A GOILING LEG.



DISCOVERED A TRAP THAT REMOVED CONDENSATE AT STEAM TEMP, —MAINTENANCE WAS TOO HIGH.



THEN I FOUND A LOW MAINTENANCE TRAP. IT DIDN'T WORK AGAINST BACK PRESSURE.



AT LAST I FOUND ONE THAT WORKED AGAINST BACK PRESSURE, BUT ITS CAPACITY RATING WASN'T DEPENDABLE.



ARMSTRONG PROMISES TRUE CAPACITIES AND EVERYTHING ELSE, SO I CALLED THEM. THEY TOLD ME TO RELAX. I COULDN'T.



THEY TOLD ME ABOUT ARMSTRONG'S GUARANTEE. WHAT'S I HAVE TO LOSE, I TRIED THEM.



EFFICIENCY IS UP, FUEL BILLS ARE DOWN, SO ARE MAINTENANCE COSTS. MAN I'M LIVING!

No one trap can do *everything* better than every other trap. Some traps vent air better than others, some remove condensate faster, etc. But, there is no one trap *best* in every phase of trapping. Armstrong has been manufacturing the Inverted Bucket Trap for nearly fifty years, and though the traps have changed with the requirements of the times, the Inverted Bucket principle has remained. For on overall trap performance, year-in and year-out, nothing beats the Armstrong Inverted Bucket Trap. It's a rugged well-built trap

that does *more* things better than any other trap. It's guaranteed because it's been proved.

For more details, see your Armstrong Representative and start living . . .

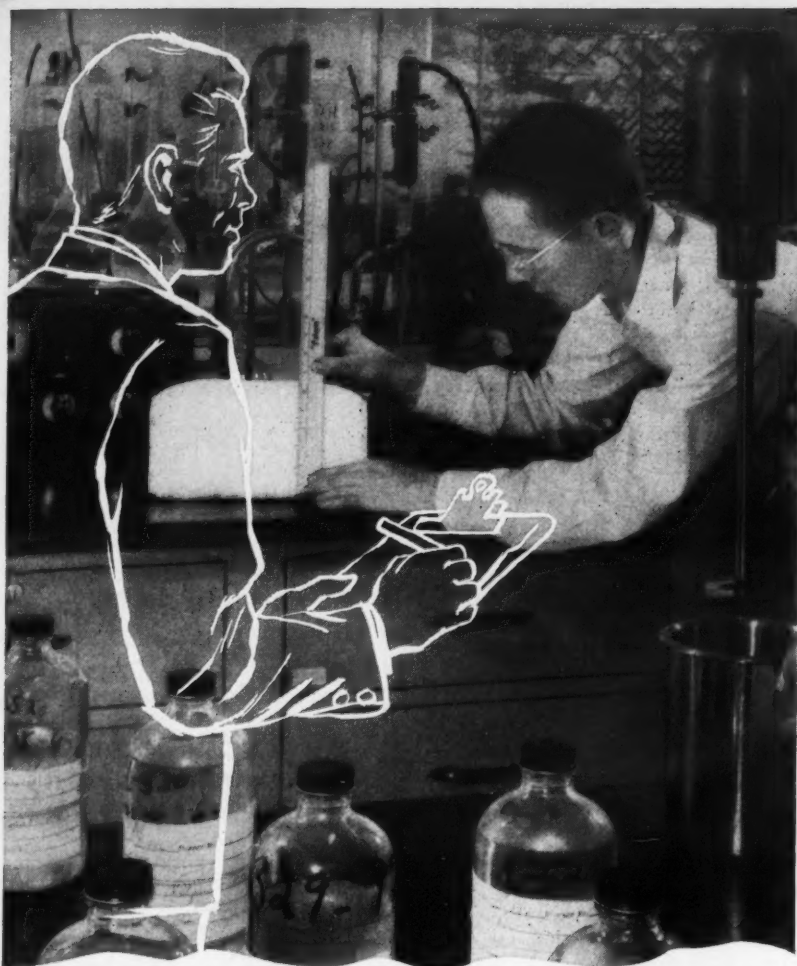
P. S. Like some good meaty reading? Ask for the 48-page Armstrong Steam Trap Book.

ARMSTRONG MACHINE WORKS
8808 MAPLE STREET
THREE RIVERS, MICHIGAN



011-57

Check 4043 opposite last page.



HOW THE SILICONES MAN KNOWS...

YOUR ONE-SHOT FOAM SURFACTANT IS ALWAYS UNIFORM

Every production batch of UNION CARBIDE L-520 Silicone Surfactant for one-shot polyether foams is thoroughly laboratory tested. This way, your Silicones Man can be sure it is *always uniform in the properties important for foam production.*

Tests are made on a standard one-shot foam formulation. The L-520 must meet minimum requirements for foam rise, settling at the height of the rise, foam uniformity, and freedom from splits.

True, a bench test cannot duplicate

the varying production conditions encountered in plants all over the country. But it does assure you of constant uniformity in the significant surfactant properties. The dependable uniform performance of L-520 has done much to bring about widespread acceptance of the one-shot polyether foam process. For data, write Dept. HG-4002, Silicones Division, Union Carbide Corporation, 270 Park Ave., N.Y. 17, N.Y. (In Canada: Union Carbide Canada Ltd., Bakelite Division, Toronto 12.)



**UNION
CARBIDE**

SILICONES

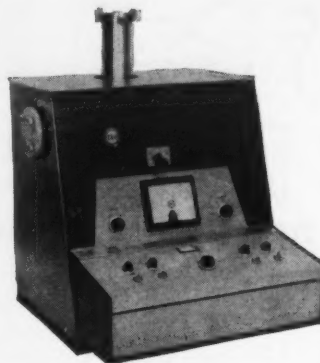
**Unlocking
the secrets
of silicones**

Rubber, Monomers, Resins, Oils and Emulsions

The term "Union Carbide" is a registered trade mark of UCC.

Check 4044 opposite last page.

Safety Slants



Sense sneakiest of leaks

... with mass-spectrometer-type leak detector. It can detect one part of helium in 10 million parts of air. In detector, liquid-nitrogen cold trap removes condensable vapors prior to entry to analyzer section. Response time of 155-lb unit is less than one sec for 50% full-scale deflection of leak-rate meter on x 1 scale. Unit operates at temperatures of 40 to 100°F in any humidity to 95%.

(Leak detector 24-210B is product of Analytical and Control Division, Consolidated Electrodynamics Corporation, Subsidiary of Bell & Howell Co.)

Check 4045 opposite last page.



Tough light bulb

... is shown here on left after being dropped five ft in comparative test with conventional bulb (right). Bulb produces lighting effect which gives appearance of gas flame in electric bulb.

Toughness emanates from

Fiberglass yarn on lamp. Bulb was developed with cooling crown to take advantage of Fiberglass winding. Cooling chamber thus created lowers filament operating temperature to reduce brittleness and fragileness.

Silicone adhesive used to bond Fiberglass yarn to basic lamp resulted in making bulb virtually impervious to thermal shock.

Components in lamp were developed by Corning Glass Works (bulb-shape design, engineering and manufacturing), Owens-Corning Fiberglass Corporation (Fiberglass yarn) and Dow Corning Corporation (silicone adhesive).

(Fluorescent lamps are product of Duro-Test Corporation, North Bergen, N.J.)

Check 4046 opposite last page.

Breakage without spillage

... is order of the day when glass vessels are covered with protective plastic film. Coating can be applied by spraying or brushing. It will normally contain both fine particles and dangerous chemicals should glass break during hazardous experiments. In addition to providing safety factor, valuable research results can be saved with recovery of chemicals involved. Coating can be peeled from glass.

(Plastic coating is subject of Cat 3100—Ace Glass Incorporated, Vineland, N. J.)

Check 4047 opposite last page.

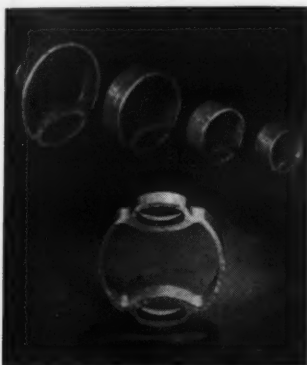
Safety-talk, collection of 52 dissertations, written by Robert L. Moore, superintendent of engineers for Kemper Insurance Co., are incorporated in booklet based on material gathered by him in more than 20 years of safety engineering. This is 10th in general industrial safety series. It is divided into sections on motivation, machines and tools, materials, movement and management. Additional information and quantity prices on Book 10 of the "Five Minute Safety Talks for Foremen" series may be obtained from National Safety Council, 425 N. Michigan Ave., Chicago 1, Ill.

**Common quarters shared
by product, heating fluid
in process pipe**

Uses: In pipe systems requiring recirculation of heating fluids.

Features: Pipe incorporates two integral channels flanking large product-carrying pipe area. Channels are utilized for circulation of heating medium.

Description: In one-piece extruded pipe, heating medium passes through one small oval passageway, maintaining temperature of bulk material in product line to insure free



Pipe (foreground) incorporates two integral channels flanking large product-carrying pipe area. It is shown with original pipe of this general type (background) which incorporated single integral channel

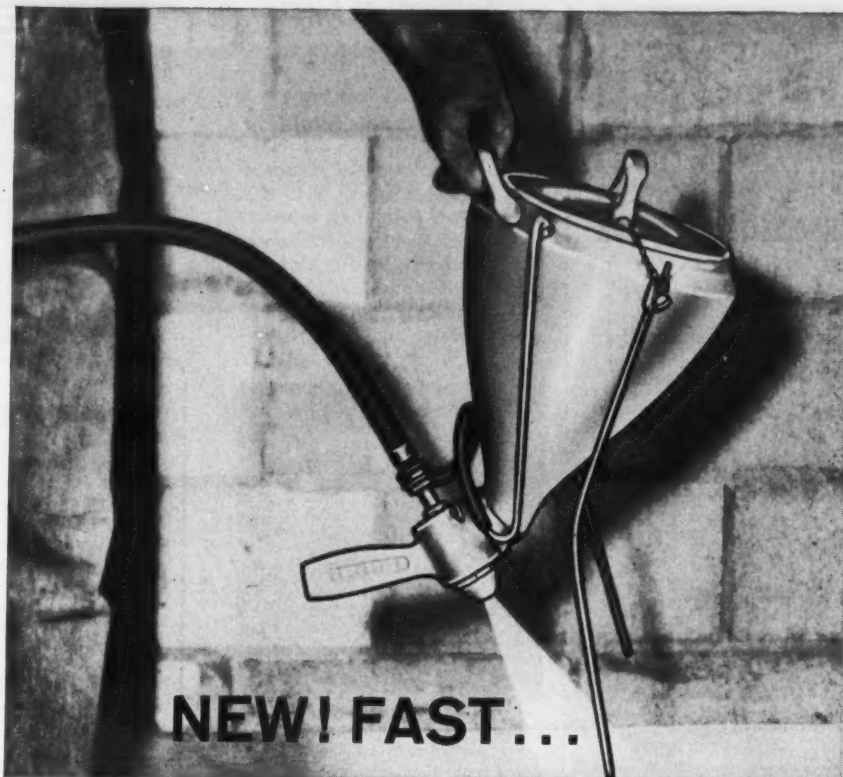
flow. At terminal, fluid is reheated (if necessary) prior to being returned through second channel.

Pipe is available in two-, three-, and four-inch sizes. It can also be used in applications requiring circulation of refrigerants, and for conveying several products in one pipe system.

(Duotrace pipe is product of Aluminum Company of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.)

Check 4048 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



economical repair of corroded concrete with...
**SPRAY-ON PENNTROWEL®
RESIN FLOOR SURFACING**

Here's the new way to speed-up re-surfacing of corroded concrete... cut labor and material costs... get long-lasting corrosion protection for your floors.

Pennrowel in the new spray-on formulation gives you all the corrosion protection and toughness that have won recognition from maintenance and process engineers across the country... *plus* the speed, uniformity, homogeneity, and cost-saving advantages of spray application.

Coatings can be made thick enough for effective corrosion protection... thin enough to make a little go a long way. Pennrowel stretches your maintenance dollar by "stretching" the coating. It cures overnight so there's no wasted down time. It bonds inseparably to the repaired surface... won't crack or slough off. Pennrowel's wearing and corrosion-proof properties have been thoroughly proved in Pennsalt's own fluorine, chlorine, and caustic plants.



Write today for complete information

Corrosion Engineering Products Dept. 370
PENNSALT CHEMICALS CORPORATION

Nacona, Pa.

Manufactured in Canada by G. F. Sterne & Sons, Ltd., Brantford, Ontario

Check 4049 opposite last page.

**SEE
YOUR LOCAL
PENNTROWEL
DISTRIBUTOR**

*for information or free
estimates on complete
installations*

BEVERLY HILLS, CALIFORNIA
The Del Jack Company
BIRMINGHAM, ALABAMA
George S. Edwards Co.
CHARLOTTE, NORTH CAROLINA
A. Lynn Thomas Co., Inc.
CHICAGO, ILLINOIS
Universal-Midwest, Inc.
CLEVELAND, OHIO
Frank Wales Smith
COLUMBIA, SOUTH CAROLINA
A. Lynn Thomas Co., Inc.
DENVER, COLORADO
Contract Engineering Company
DETROIT, MICHIGAN
Charles K. Kaiser
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Kaiser Refractories & Chemicals Div.
MINNEAPOLIS, MINNESOTA
P. L. Crowlie
NEW ORLEANS, LOUISIANA
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NEW YORK, NEW YORK
Carl Buck & Associates
NORFOLK, VIRGINIA
A. Lynn Thomas Co., Inc.
PHILADELPHIA, PENNSYLVANIA
A. B. Seither & Co., Inc.
PITTSBURGH, PENNSYLVANIA
Equipment Engineering Company
PORTLAND, OREGON
The E. J. Bartells Company
PROVIDENCE, RHODE ISLAND
Macalaster Bicknell Company
RALEIGH, NORTH CAROLINA
A. Lynn Thomas Co., Inc.
RICHMOND, VIRGINIA
A. Lynn Thomas Co., Inc.
SALT LAKE CITY, UTAH
C. H. Spencer & Company
SAN FRANCISCO, CALIFORNIA
The E. J. Bartells Company
SEATTLE, WASHINGTON
The E. J. Bartells Company
ST. LOUIS, MISSOURI
Shutt Process Equipment Corporation
WEBSTER, NEW YORK
W. F. Decker, Inc.
WINTER PARK, FLORIDA
Robert C. Kany





put your production
IN SAFE HANDS
with *SURETY*
SURESEAL GLOVES

SURESEAL MOST SPECIFIED WHERE

- ✓ the handling of acids and other corrosive materials demand maximum hand protection.
- ✓ production requirements prescribe fast, sure handling of caustic liquids.
- ✓ positive protection against crippling and disfiguring accidents is a necessity.
- ✓ longer glove life is needed.

Surety Sureseal Gloves, (made from Hycar) give positive protection against the greatest number of acids and other corrosive liquids and wear up to 14 times longer than competitive materials. They are more snag, abrasion and puncture-proof and the exclusive Surety Turn-Cuff gives added protection for arms and prevents liquid from getting into the glove.

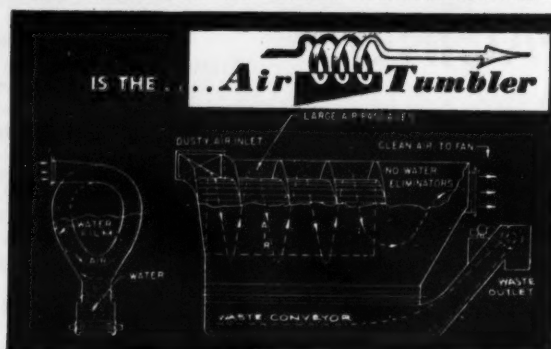
Tell us your requirements and test a pair today — at our expense. Write on your letterhead naming your glove jobber and you will receive a pair by return mail.

THE **SURETY** RUBBER CO.
CARROLLTON, OHIO

IN CANADA: Safety Supply Co., Toronto

Check 4050 opposite last page.

The MASTER of DUST in INDUSTRY



THE WET COLLECTOR THAT BECOMES STANDARD EQUIPMENT WHEREVER TRIED BECAUSE IT DOES A BETTER JOB AT LESS COST.

More than one million CFM in ONE plant

Write for Bulletin No. 601 Address

**DUST SUPPRESSION
& ENGINEERING CO.**

P. O. BOX 67 • LAKE ORION, MICHIGAN

Check 4051 opposite last page.

ENGINEERING & SAFETY

Molded halves mitigate fittings-insulation fumbling

Uses: Insulation of standard pipe fittings.

Features: Insulation is made in form of two molded halves which conform to shape of fitting in question.

Description: Molded fiber-glass fittings insulation is in-



Molded fiber-glass fittings insulation comes in standard sizes for welded and cast ells, tees and (upon request) special shapes

stalled with staples, soft wire or tape. Once in place it can be finished with canvas or vapor-barrier casings. It comes in standard sizes for welded and cast ells, tees and (upon request) special shapes.

(FIT*rite insulation is product of Fibrous Glass Products, Inc., Subsidiary of Pall Corporation, Alpa Plaza, Hicksville, L.I., N. Y.)

Check 4052 opposite last page.

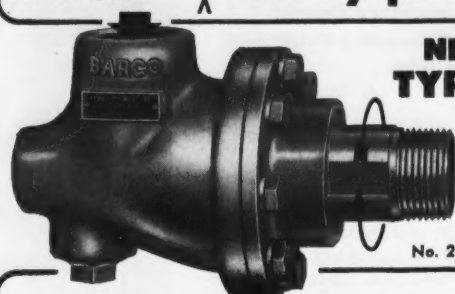
Spray-can snoopers ferret out cracks

Uses: Detection of cracks during construction or maintenance overhaul, in combination with small portable testing kits and larger units. Test is useful on pipe and valves, welds, tanks, reactors and other types of mechanical equipment.

Features: Magnetic-particle inspection materials are available in pressurized spray cans and plastic squeeze bottles.

Description: Three types of inspection agents are available — spray-can prepared fluorescent bath (Magnaglo), spray-can prepared red bath (Magnaflux) and squeeze-

Better Need a rotary joint?



**NEW
TYPE C**

Patent
No. 2,836,439

- it's BARCO!

For countless applications, Barco's new Type C Rotary Joint will give you the best operating records you've ever had—and for **LESS COST!**

RESISTS SEAL RING BREAKAGE—The spherical seal ring is under compression, not tension, loading. Self-adjusting for wear. Seal withstands shock loads and alternating hot and cold service.

WIDE SPACED BEARINGS—Two, instead of one... increased bearing area. No lubrication required. Lowest friction.

MULTI-USE—One basic style for all services, single flow or syphon flow, quick availability from LOCAL STOCKS.

200 P. S. I. STEAM RATING—Heavy duty service at no extra cost. Eight sizes, 1/4" to 3". Send for new Catalog 310 today. **BARCO MANUFACTURING CO., 537J Hough Street, Barrington, Illinois.**

Check 4053 opposite last page.

Accurate Flow Control of Viscous Fluids

New Jacketed Diaphragm Control Valves

... apply heat uniformly throughout the valve from flange to stuffing box.

Valve will operate in response to control air from any standard 3-15% range pneumatic controller. Diaphragm operators for 6-30% ranges are available.

Bodies are semi-steel, Ductile Iron, steel or stainless steel to suit application.

Sizes range from 1 1/4" to 4". Larger sizes on application. For complete details and dimensions write for supplement catalog 356-S.



Parks-Cramer Co.
PROCESS HEATING DEPARTMENT
ELICHBURG 12, MASSACHUSETTS

Check 4054 opposite last page.

CHEMICAL PROCESSING



Gray-powder detecting material and plastic squeeze-bottle is being used to test premagnetized parts or cracks

bottle gray powder (Magnaflux).

(Spray-can Magnaglo Bath, spray-can Magnaflux Bath and squeeze-bottle Magnaflux Powder are products of Magnaflux Corporation, Subsidiary of General Mills, 7300 W. Lawrence Ave., Chicago 31, Illinois.)

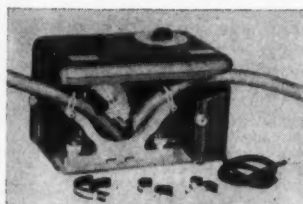
Check 4055 opposite last page.

Metals are never met in flow inducer

Uses: Moving liquids, slurries, emulsions, gases, creams and dried powder.

Features: Materials passing through inducer never touch any metal parts, going entirely through hose portion.

Description: Flow inducer is variable from a few cc/min to nearly 500 gph. Its steplessly variable motor goes up to 200 rpm. Unit accommo-

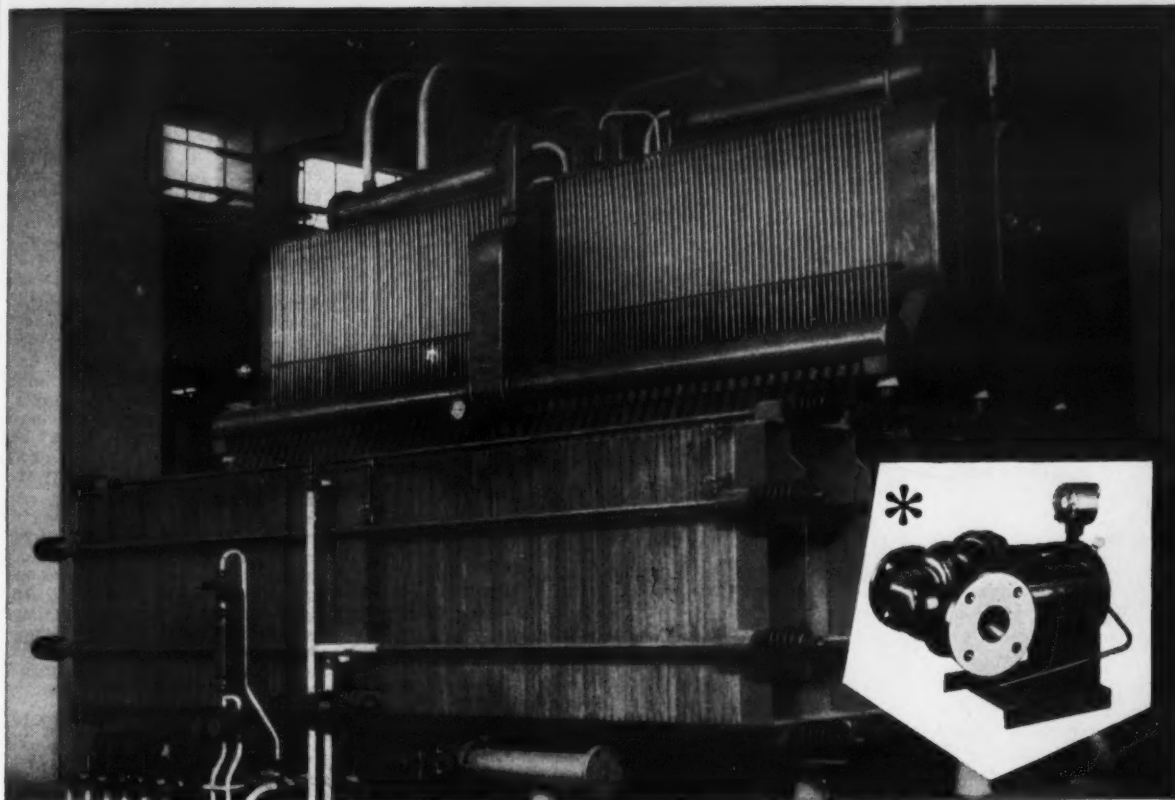


Flow inducer is variable from a few cc/min to nearly 500 gph

dates hose of any size up to one inch. Reversible switch with positive-lock safety feature permits flow in either direction.

(HR flow inducer is product of Schuco Scientific, Division of Schueler & Company, 75 Cliff St., New York 38, N.Y.)

Check 4056 opposite last page.



120 Chempumps Work 365 Days a Year In the World's Largest Electrolysis Plant

Leakproof Chempumps are eliminating pump maintenance worries and downtime at the world's largest water electrolysis plant, operated by Hindustan Chemicals and Fertilizers, Ltd., at Nangal, India. Enormous quantities of hydrogen are produced for use in much-needed fertilizers for Indian farmers.

One hundred and twenty double-suction Chempumps provide long, satisfactory life under conditions of infrequent maintenance—a vitally important contribution since the plant produces 800,000 cubic feet of hydrogen an hour and operates continuously 365 days a year.

Two Chempumps in each of the sixty 24' x 18' electrolyzers circulate the electrolyte, a 25-30% KOH solution, to the bipolar cells. These pumps combine motor and pump in one sealless unit that prevents leakage or contamination of the electrolyte through elimination of conventional seals and stuffing boxes . . . and assures a continuous, pure supply of electrolyte to the cells.

The Hindustan Chempumps have a capacity of 90-100 gpm at a 3' head. Extremely small in size, they fit easily into the piping arrangements of the compact electrolyzers. Entirely maintenance-free with the exception of occasional bearing checks, they save "considerable time and money" at the Nangal plant.

* High-capacity, low-head Chempumps, using double-suction casings and impellers, were designed and built especially for this installation. Hydraulic balance, plus extremely low motor loading, assures uninterrupted operation for Hindustan, particularly important where maintenance is necessarily infrequent. By eliminating seals and stuffing boxes, Chempump "canned" pumps eliminate 90% of pump problems for processors throughout the world.

To learn what Chempump can do for you, write for COMPOSITE BULLETIN 1100. Chempump Division, Foster Corporation, Buck and County Line Roads, Huntingdon Valley, Pennsylvania.

First in the field . . . process proved

F C H E M P U M P

Check 4057 opposite last page.

ANTI-PARALLAX FACE

Anti-parallax BIMET[®] face eliminates reading errors when dial is viewed from any angle.

STAINLESS STEEL CASE

Stainless Steel Construction throughout, including the most rugged Polished Stainless Steel Case available for the ultimate in corrosion resistance and strength, is exclusively provided on all Moeller BIMETS.

*Moeller
Features*

HERMETICALLY SEALED

Hermetically sealed with dry air to prevent entry of moisture and condensation throughout the life of the instrument.

RECALIBRATION

Exclusive Moeller external recalibration feature provides adjustment of pointer on scale so that scale is always upright and easily readable. Thermometer remains sealed. Only Moeller BIMETS offer the convenience and error-free readability of vertically oriented dials.

Provide Timeless Accuracy

You'll appreciate the superior accuracy, reliability and rugged construction of the NEW 3" and 5" BIMET[®] Thermometers. Silicon dampening stabilizes the pointer against vibration assuring precise reading and reduced wear.

Moeller BIMETS offer superior reliability of measurement, easy, accurate reading, the most rugged construction, simplicity of installation and guaranteed accuracy of 1% of full scale.

The NEW 3" and 5" BIMETS are available for ranges from -100 F to +1000 F or -70 C to +500 C with glass or plastic fronts. Standard 1/4" or 3/8" O.D. stems, up to 100" in length may be ordered in any angular position. Moeller exclusive swivel nuts or fixed connections are furnished.

Get your copy of BIMET[®] Catalog #225D from your Moeller Representative or write

MOELLER INSTRUMENT COMPANY, Inc.

132nd Street and 89th Avenue, Richmond Hill 18, N.Y.

Representatives in principal cities.

BIMET[®] is a registered trademark of Moeller Instrument Company, Inc.



Check 4058 opposite last page.

NEW LITERATURE

Plant Engineering
Maintenance & Safety

Psychrometric chart goes to 350°F, dry-bulb temperature. Psychrometric Chart—J. O. Ross Engineering, Division of Midland-Ross Corporation.

Check 4059 opposite last page.

Rubber hose comes up for consideration in 24-page catalog which, for each item and line, provides illustration, full description of application and construction and pertinent data as to size, weight, ply-working pressure, etc. in chart form. Industrial Hose Cat may be obtained by letterhead request from Mercer Rubber Company, Hamilton Square, N. J.

Mechanical vacuum pumps are delineated in six-page bulletin which includes drawings of both single- and double-stage units in various capacities. Bul 8-15—Consolidated Vacuum Corporation, Subsidiary of Consolidated Electrodynamics/Bell & Howell.

Check 4060 opposite last page.

Silicon-rectifier DC-power savings to electrochemical and allied industries are told of in 20-page booklet B-7900—Westinghouse Electric Corporation.

Check 4061 opposite last page.

Ion exchange calculator can be used by hard-water-treatment-systems engineers to quickly figure conversion of ppm water hardness to grains/gal hardness, amount of exchange resin needed, brine and salt requirements for max efficiency, and brine-tank size and operating brine-level adjustments. Ion Exchange Calculator—Morton Salt Company.

Check 4062 opposite last page.

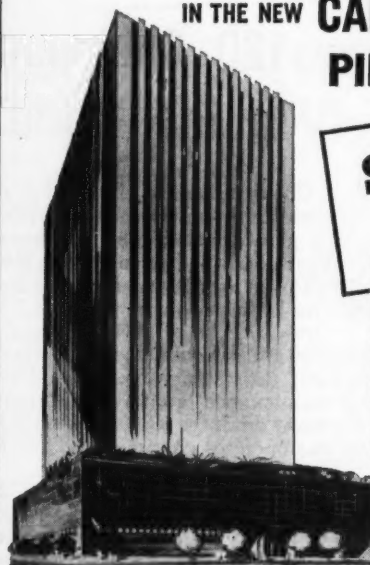
Chemical-industry housekeeping is subject of second pamphlet in Safety Guide Series. Four-page illustrated publication covers responsibility for good industrial housekeeping and benefits derived from it. Details on how this practice can be established and maintained are also included. Copies of Bul SD-2 are available at 20¢ per copy from Manufacturing Chemists' Association Incorporated, 1825 Connecticut Ave., N.W., Washington 9, D. C.

IN THE NEW CALIFORNIA BANK BUILDING PIPING SYSTEMS

ARE
**SAFE and
SILENT!**

Silent Check Valves operate instantly when flow reversal starts or when flow is zero. In this handsome new Los Angeles structure, as in hundreds of other major buildings—surge pressures are controlled, troublesome water hammer is eliminated.

Write for Bulletins: No. 659 on Pressure Loss Tests . . . No. 654 on Valves . . . No. 851 on Cause, Effect and Control of Water Hammer.



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Williams-Hager
**Silent
CHECK
VALVES**

Check 4063 opposite last page.

CHEMICAL PROCESSING

ENGINEERING & SAFETY

Adhesive-application methods are covered in 32-page handbook which details field-tested application methods for bonding concrete — surface preparation, equipment required, mixing procedures, curing and use of solvents in adhesives. Application Methods Handbook — International Epoxy Corporation.

Check 4064 opposite last page.

Welding fittings of seamless type are depicted in 12-page bulletin, including description of seamless manufacturing operations, dimensional and metallurgical control processes and testing procedures. All types are shown with size ranges and several application examples are given in Bul 60-C—Midwest Piping Company, Inc.

Check 4065 opposite last page.

Roller chains and sprockets are considered in 44-page booklet which incorporates 18-page section listing stock sizes of standard roller chains. Also, a 20-page section covers various types of sprockets. Book 2757—Link-Belt Company.

Check 4066 opposite last page.

Filler alloys are correctly specified for all recommended wrought-alloy parent-metal combinations in Filler Metal Selection Chart—Aluminum Company of America.

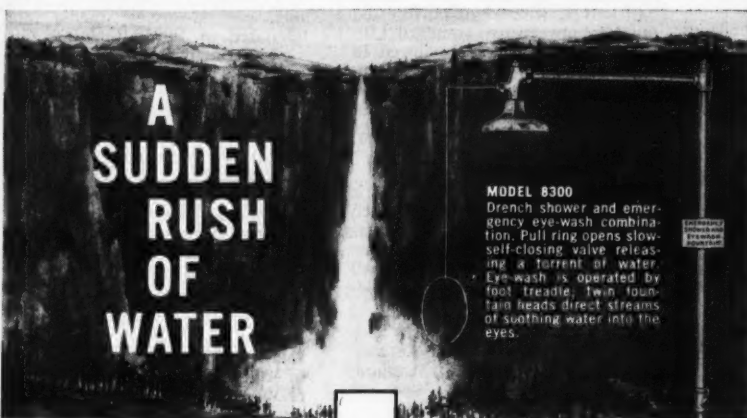
Check 4067 opposite last page.

Strainers are featured in 88-page handbook of simplified selection and sizing. Handbook contains compilation of reference data for layout of fluid-flow systems and sizing of strainers, tabulated results of testings and valve- and pipe-selection information. Strainer Guide—Tate Engineering, Inc.

Check 4068 opposite last page.

Aluminum welding, brazing and soldering are topics under consideration in 40-page manual, incorporating information on welding aluminum and its alloys by inert-gas-shielded metal arc with consumable electrode, inert-gas-shielded metal arc with tungsten electrode and the latest arc- and gas-welding processes. Considerable other information is included in Aluminum Manual — All-State Welding Alloys Co., Inc.

Check 4069 opposite last page.



for immediate **FIRST AID**
...in accidental
body contamination

Injurious chemicals are instantly washed away by the cascading water from Haws Drench Showers. Simple pull-chain or foot treadle valves release a sudden rush of water—saving valuable seconds until medical help arrives. Chances of permanent injury are minimized, and insurance claims correspondingly lessened. HAWS Emergency Drench Showers are available in models to meet virtually any industrial need. WRITE TODAY—to find out the full story!

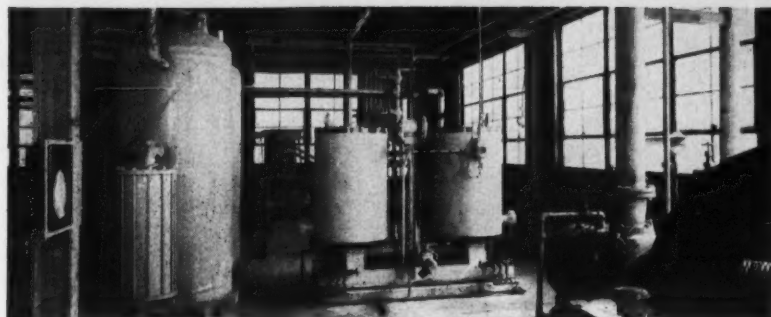
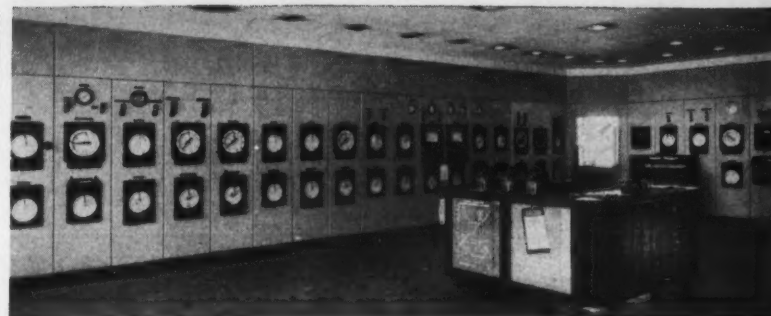
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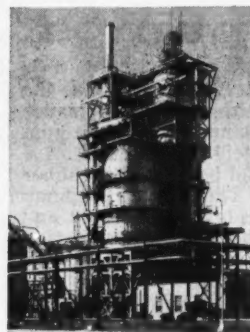
Check 4070 opposite last page.



Sohio installs central Lectrodryer for plant's instrument air

The BWC-750 Lectrodryer shown above is serving the fluid catalytic cracking unit at Standard Oil Company (Ohio) in Lima. Replacing two smaller units, it delivers air at -100°F in a volume well ahead of maximum demand. Now there's no chance of instrument failure because of air-line freezeups, no rust or mud to clog instrument ports.

In refineries and other processing plants, small dryers have often been placed at outlying locations, near the operations they serve. This meant many dryers to service and the possibility of freezeups between the air compressor and dryers. Many of these smaller dryers are being replaced with single, large Lectrodryers, able to dry all the air a plant uses.

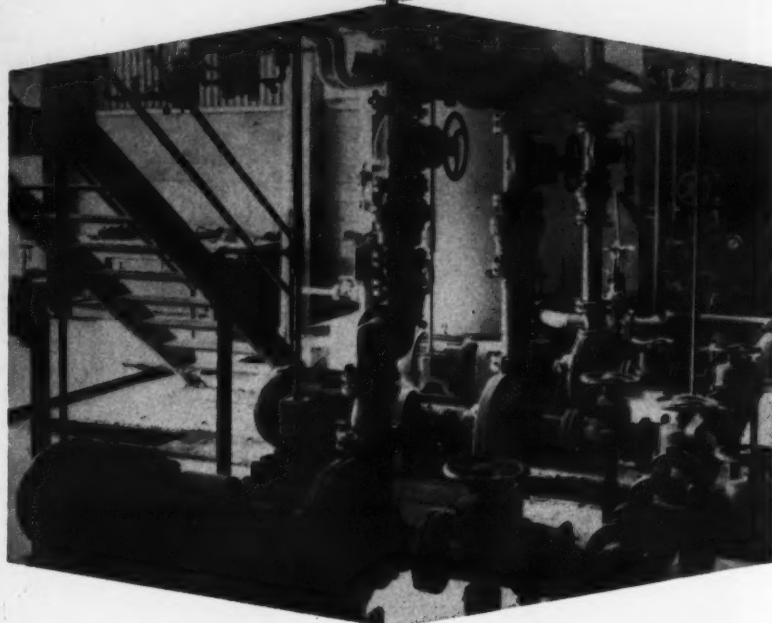


Case history sheets describing drying operations involving a few cubic feet of air per hour or thousands—drying other gases or organic liquids—will be sent at your request. Tell us your drying problem and we'll recommend drying methods and equipment. Write Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd Street, Pittsburgh 30, Pa.



Check 4071 opposite last page.

**ONLY DORR-OLIVER MAKES
3 DIFFERENT PUMP TYPES
for complete chemical coverage**



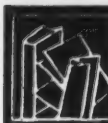
how Goodyear handles corrosive liquids with **OLIVITE** acid handling pumps

At the Goodyear synthetic rubber plant at Houston, Texas, the two Olivite pumps photographed above give excellent performance in a corrosive application. The larger 4" pump handles 350 gpm of mother liquid containing about 4% by weight brine and .25% sulphuric acid from the shaker screen located between the rubber crumb soap conversion and reslurry tanks. The smaller 2" pump handles 70 gpm of .5% dilute sulphuric acid. Mother liquid and acid are combined for charging to the rubber crumb coagulation tank. TDH for both pumps is 110'.

Casings and impellers of Olivite acid handling pumps are protected against corrosion by a covering of synthetic rubber. Behind them stand the specialized knowledge and experience of Dorr-Oliver—the only manufacturer offering three distinctly different pumps for complete coverage of all needs of the chemical processing industries. For complete information, write Dorr-Oliver Incorporated, Stamford, Conn.



Check 4072 opposite last page.



manufacturers' current literature

This section features a variety of literature currently available from manufacturers. See also the other sections in this issue for new literature pertaining to those particular sections

Ball Valves

Engineering section of 42 pages is highlight of 56-page ball valve catalog. Section incorporates detailed specifications on various body and seat materials available. A seven-page corrosion-resistance guide also appears in the engineering section of Cat BV-60 — Pacific Valves, Inc.

Check 4073 opposite last page.

Plastic ball valves are subject of two single-sheet bulletins. One (C 359) features a four-inch series available in PVC Types I and II, Kralastic, polypropylene and Penton. A second bulletin (C 859) specifies a three-way model available in Types I and II PVC. Buls C 359 and C 859 — Chemtrol.

Check 4074 opposite last page.

Detachable-pipe-end and flange ball valves, which can be inserted quickly between two standard 150- to 300-lb flanges are reviewed in Buls EB-101 and EF-201, respectively — Worcester Valve Co., Inc.

Check 4075 opposite last page.

Maintenance of ball valves is covered in 12-page booklet which includes step-by-step instructions accompanied by photographs. Line of semi- and carbon-steel ball valves is specified in 16-page catalog. Maintenance Manual and Cat 1000 — W-K-M, Division of ACF Industries, Incorporated.

Check 4076 opposite last page.

Injection-molded UPVC and Penton ball valves of top-entry design are detailed in four-page bulletin including application photographs. Ball Valves Bul — Tube Turns Plastics, Inc.

Check 4077 opposite last page.

Double-sealed-type screwed-end, ¼ to 3" ball valves; screwed, flanged or weld-end, ¼ to 2" PVC ball valves; flanged, ½ to 10" ball valves; remote cylinder operators; electric-motor operators; PVC flanged-end 3 and 4" ball valves; and ¼ to 2", high-pressure ball valves are specified in Data Sheets 1 to 8, respectively — Jamesbury Corp.

Check 4078 opposite last page.

Ball-plug valves which are operated by handwheels are topic of 20-page catalog, incorporating detailed drawings with numbers indexed to various parts. Cat V-60A — Hydril Company.

Check 4079 opposite last page.

Numbered drawing with accompanying notes identifies basic features of flanged and screwed-end ball valves in bulletin which also gives specifications for various valves in line. Bul PR-1 — The J. L. Putnam Company, Inc.

Check 4080 opposite last page.

Flanged, screwed, compression-mounted, socket-weld and sanitary ball valves are depicted in eight-page Bul BVF — Cooper Alloy Corporation.

Check 4081 opposite last page.

Standard and special designs of ball valves for cryogenic, corrosive and general-service media are tabulated in Flo-Ball Valves Cat — Hydromatics, Inc.

Check 4082 opposite last page.

Detailed drawings and specification tables are utilized to present ball-valve line in 78-page catalog, which also includes three-page corrosive media list specifying materials for various chemicals. Cat 60 — Rockwood Sprinkler Company, Division of The Gamewell Co.

Check 4083 opposite last page.

Lubricated ball valves are subject of 10-page bulletin which depicts features and construction details of both bevel-worm-gear and manual-hydraulic types. Bul V-607 — Rockwell Manufacturing Co.

Check 4084 opposite last page.

All information necessary to plan-out ball-valve use in a chemical plant is incorporated in Comprehensive Cat — Hills-McCanna Company.

Check 4085 opposite last page.

BALL VALVES IN THE CPI . . . their history, features and manufacturers . . . are subject of a special four-page report beginning on p. 34.

Packaging

Drum-filling systems for 55-gal containers incorporate sterile cold filling. They are explained in Sterilpac® Bul — Thermovac® Inc., Subsidiary of Rheem Manufacturing Co.

Check 4086 opposite last page.

Drums and pails for petroleum products are considered in Containers Bul — Container Division, Jones & Laughlin Steel Corporation.

Check 4087 opposite last page.

Steel containers are available in sizes of 1 through 55 gal and wide selection of styles, closures and linings. Containers are considered in Steel Containers Bul — Vulcan Containers, Inc.

Check 4088 opposite last page.

Drying and Heating

Electric strip heaters, for tanks, kettles, pipe, platens, dies, ovens and other applications, are available in variety of shapes, sizes and wattages. They are pictured in Bul PA100 — Edwin L. Wiegand Company.

Check 4089 opposite last page.

Steam-atomizing oil burners produced in five sizes have rated capacities of 10 to 725 gph. Additional data are tabulated in 16-page Bul 21 — National Airoil Burner Co., Inc.

Check 4090 opposite last page.

Universal register units have capacities of 60 to 500 gph. Data on these are incorporated in four-page Bul 51A — National Airoil Burner Co., Inc.

Check 4091 opposite last page.

Silicon-carbide heating elements are capable of temperatures to 2800°F. Elements are available in sizes of ¼ to 2-½" diam and lengths of 4 to 105" in length. Resistance tolerance is ±10%. Their physical and electrical characteristics are described in Bul H — Global Plant, Refractories Division, The Carborundum Co.

Check 4092 opposite last page.

Conveyor dryer is specified in Bul 462 — Proctor & Schwartz, Inc.

Check 4093 opposite last page.

Automatic packaged firing units for oil and/or gas fuels are available in standard-unit capacities of 200 to 830 boiler hp. These and larger units for special needs are depicted in Bul 28 — National Airoil Burner Co., Inc.

Check 4094 opposite last page.

Dual-stage oil burners incorporate both mechanical and steam-atomizing principles. Three standard sizes are shown in four-page Bul 25 — National Airoil Burner Co., Inc.

Check 4095 opposite last page.

Packaged steam and hot-water generators are available in 15 to 750 hp for pressures of 15 to 200 psi. They are explained in Hot Water Generators and Steam Generators Buls — Cyclotherm Division, Crane Company.

Check 4096 opposite last page.

Fuel-oil pumping and heating units are available in single and duplex models for 2 to 100 gpm in standard and special types. They are treated in 16-page Bul 40 — National Airoil Burner Co., Inc.

Check 4097 opposite last page.

Fluids Handling

Vertical pump handles molten chemicals. Horizontal pump is good for service with black liquor and caustic in evaporator service or for transfer of fluids under vacuum. Both are treated in Bul V-837 — Taber Pump Co.

Check 4098 opposite last page.

Bin-level controls will start or stop flow of materials or operate signal light or horn automatically. They are presented in Bul 159 — Standard Products Division, Stephens-Adamson Mfg. Co.

Check 4099 opposite last page.

Pump cups are available in designs including conventional and 45° bevel types, and in full range of sizes for all reciprocating-pump and cylinder requirements. They are tabulated in Bul 5903 — Darling Valve & Manufacturing Co.

Check 4100 opposite last page.

Packing rings and piston cups which are Teflon-impregnated are for operation in -100 to +500°F range (to 650°F under certain conditions). They are delineated in Form P-8907 — Packing Division, Raybestos-Manhattan, Inc.

Check 4101 opposite last page.



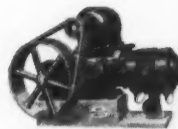
HERE'S WHY the simple design
of this compressor valve...

makes PENNSYLVANIA COMPRESSORS run efficiently...silently...with minimum maintenance.

Stainless steel valve discs lift against a cushion of air in the simple, efficient design of the Air Cushion Valve that makes PENNSYLVANIA Compressors run so silently, so dependably, and with such low maintenance requirements. Air Cushion Valves have no nuts, bolts, or screws to break or burn fast. You get longer valve life . . . eliminate wear . . . eliminate noise caused by metal striking metal. Flat valve discs have no flexing or bending action to weaken or distort them. And the valve springs are highest grade stainless steel, rolled on edge, insuring maximum strength and durability. There is just one spring for each disc, and it bears evenly on the entire surface.

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Check 4102 opposite last page.



*Absolute
Line Shut-off*

**BY ONE MAN -
IN ONE MINUTE!**

HAMER *Visible Shut-off* **LINE BLIND VALVES**

HAMER PLUG VALVES

Will not stick or freeze. Perfect for hard-to-hold fluids. Simple plug adjustment nut eliminates sticking



Hamer Line Blinds are unsurpassed for positive action, easy operation, long-life service and lasting safety. One man can open or blind a line in less than one minute, and there is nothing like a solid plate for a PERMANENT LEAKPROOF SHUT-OFF. Bar or handwheel operation eliminates wedges, hammers, wrenches needed for spreading conventional flanges. Removes fire hazard of sparking and stops damage to equipment.

Write for **FREE** catalog

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WELL EQUIPMENT MFG. CORP.
HOUSTON, TEXAS



Division of CHIKSAN COMPANY a subsidiary of
FOOD MACHINERY AND CHEMICAL CORPORATION



Check 4103 opposite last page.

CURRENT LITERATURE

Pneumatic ejectors are recommended for low gallonages. Smallest of models will pass solids up to size of inlet and discharge valves — min of four inches. Ejectors are topic of Pneumatic Ejectors Bul — Yeomans.

Check 4104 opposite last page.

Steam traps which have only one moving part are good for pressures of 10 to 600 psi. They are detailed in TD-50 Steam Trap Bul — Sarco Company, Inc.

Check 4105 opposite last page.

Welding fittings and flanges available in carbon steel and Croloy's in complete range of types and sizes. They are inventoried in Bul FB502 — Tubular Products Division, The Babcock & Wilcox Company.

Check 4106 opposite last page.

Forged-steel fittings, flanges and unions come packed in modular-designed cartons for handling and storage-space economies. All dimensions are in multiples of three inches. Data on quantities and weights of items as packaged in various sizes of cartons is indexed in Folder PF-1 — Henry Vogt Machine Co.

Check 4107 opposite last page.

Flexible hose and connectors of stainless steel are taken up in two bulletins. Flexible Connectors and Flexible Metal Hose Buls — Allied Metal Hose Company.

Check 4108 opposite last page.

Steam-trap selection, installation, and maintenance are the topics of discussion in 44-page Steam Trap Book — Armstrong Machine Works.

Check 4109 opposite last page.

Ductile-iron pipe fittings are explained in Ductile-iron Pipe Fittings Bul — The Kuhns Brothers Co.

Check 4110 opposite last page.

Spray nozzles of solid-cone type are available in ¼, ¾ and ½" sizes. These and flat-spray type, available in ¼, ½ and ¾" sizes, are both taken up in Spray Nozzles Cat — Industrial Nozzle Division, Wm. Steinen Mfg. Co.

Check 4111 opposite last page.

Pumps are topic of catalog including coverage of centrifugal, rotary, gear and laboratory units. Pumps Cat — Eco Engineering Company.

Check 4112 opposite last page.

Processing Equipment

Processing equipment of all types is tabulated in "First Facts" — The Falcon Manufacturing Division, First Machinery Corp., Inc.

Check 4113 opposite last page.

Stainless-steel sifters (153-B), high roller mills (153-B) and pneumatic-conveying systems (18-F) — similar to those successfully used together in manufacturing line of dehydrated garlic and onion products. — are reviewed in Buls 153-B and 18-F — Sprout-Waldron.

Check 4114 opposite last page.

Diatomaceous silica, for use in filter aids, absorbents, aggregates, fillers and catalyst supports, is reviewed in 16-page bulletin picturing mining and processing facilities, and including other data. Form A-498 — The Eagle-Picher Company.

Check 4115 opposite last page.

Glassed-steel reactors are considered in three bulletins. Specified and depicted are 30-, 50-, and 100-gal series (927); 200-, 300-, and 500-gal series (971); and 500-, 750-, 1000-, and 2000-gal series (988). Buls 927, 971 and 988 — Pfaudler Division, Pfaudler Permutit Inc.

Check 4116 opposite last page.

Blenders, which start four-way blending while charging and continue it during discharge, are subject of Bul O80B — Sturtevant Mill Co.

Check 4117 opposite last page.



"Law of Conservation of Matter, Hogan! Everything that goes into a test tube must come out."

CURRENT LITERATURE

Jet-vacuum refrigeration is discussed in Refrigeration Engineering Study — Croll-Reynolds Co., Inc.

Check 4118 opposite last page.

Centrifuges for pilot-plant operations, small production and product development are subjects of three bulletins. One (1287) continuously handles wide range of particle sizes in slurries with solids concentrations of 1/2 to 50%. Second model (103) is pilot-plant basket type for loads to 80-100 lb/cu ft densities. Third unit (1269) is laboratory model and serves as standard equipment for many process operations involving recovery of small amounts of solids from liquids, clarification of liquids and separation of two immiscible liquids. Buls 1287, 103 and 1269 — The Sharples Corporation.

Check 4119 opposite last page.

Jar-rolling machines permit multiple batches of similar or different materials to be grouped, pulverized or mixed simultaneously. Units are indexed in Cat 79 — Abbe Engineering Co.

Check 4120 opposite last page.

Leakproof chemical pumps are subject of Composite Bul 1100 — Chempump Division, Fostoria Corporation.

Check 4121 opposite last page.

Crushers are considered in Crushers Bul — The Bauer Bros. Co.

Check 4122 opposite last page.

Self-cleaning dust collector incorporates filter bags with three-section design for strength. Spacer weight is distributed on three seams, and bags are cleaned by reverse air in unit, which is reviewed in 36-page Cat 104 — The W. W. Sly Manufacturing Co.

Check 4123 opposite last page.

Portable mixers each consist of two rotating impellers and two stationary stators enclosed in cylindrical housing. Mixers are tabulated in Shear-Flow Mixers Bul — Gabb Special Products Inc.

Check 4124 opposite last page.

Mixers are delineated in Lightnin Mixers Bul — Mixing Equipment Co., Inc.

Check 4125 opposite last page.

Chemical-processing equipment of all types is featured in Chemical Equipment Bul — Sun Shipbuilding & Dry Dock Company.

Check 4126 opposite last page.

The Lamports Co. presents **VELCRO®** TOUCH TO CLOSE FASTENER

VERSATILE non-metallic FILTER CLOSURE CUTS COVERING COSTS DRASTICALLY

eliminates costly hand-sewn closures! Saves man hours! Cuts down time!

VELCRO Touch to Close

Fasteners are a tough, strong, jam-proof alkaline resistant closure or fastener for use on disc, drum, leaf or bag filters. Eliminates hand sewing, corrosion of metal snaps, assures positive alignment, cuts reclothing costs and filter cloth changing time. Holds cloth taut and smooth to facilitate cake release. Try VELCRO. See for yourself how your process operations can be speeded by this remarkable closure.



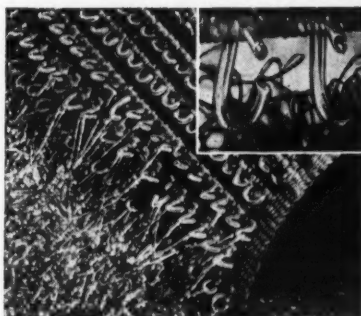
Chemical Week Photo

Non-metallic VELCRO fastener on filter cover permits speedy installation or replacement.

VELCRO OFFERS NEW MARKET POTENTIAL TO THE CANVAS INDUSTRY

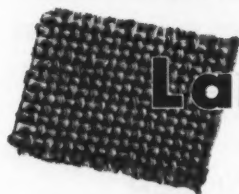
VELCRO Closures are a unique idea employing two nylon tapes, one covered with thousands of soft nylon loops, the other with stiff nylon hooks. These tapes, when pressed

together, form one of the most efficient fasteners yet devised for industrial use. Does away with undesirable wrinkles . . . and can be bonded, stapled or sewn to the cloth.



Photomicrograph shows tiny hooks engaging loops of pile tape to form closure.

LAMPORTS PROVIDES QUALIFIED TECHNICAL ASSISTANCE IN YOUR FILTRATION PROBLEMS



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Check 4127 opposite last page.



Rocket fuel pours from mixer at Thiokol's Huntsville, Alabama plant. For purity, cast

Nickel-chromium-molybdenum blades are used to disperse oxidizer through the fuel.

Unique Stainless Steel Mixer Blades Boost Solid Rocket Power Production

Cleanliness is a must in sensitive and highly critical manufacture of solid rocket propellants.

Take mixing. Following reduction to precise size, particles of the inorganic oxidizer must be thoroughly dispersed through the viscous polysulphide. This must be done under conditions which exclude all contaminants, even trace metal from the equipment itself.

For efficiency. Thiokol Chemical Corporation uses a Baker Perkins Universal mixer specially equipped with "S"-shaped blades.


For product purity the blades are

made of Type CF-8M (ACI designation) stainless steel. This is a 19% chromium, 10% Nickel, 2.5% molybdenum material with low (0.08%) carbon content. The alloy is highly resistant to corrosion by constituents of solid fuel, and by alkaline cleansers. Its use prevents contamination of the product by corrosion products and assures long blade contour life and maximum mixing efficiency.

For economy the intricately-shaped blades are cast. Casting also permits smooth contours. Sharp corners and pockets that might trap contaminants or establish focal points for

corrosion are eliminated. What's more, quick flush cleaning can be done reliably.

There may well be a place in your process equipment where stainless steel should be specified; for efficiency, for product purity, for economy. For an idea of what you can expect from these materials, write for a copy of the new Inco booklet, "Heat Resistant Castings, Corrosion Resistant Castings, Their Engineering Properties and Applications."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street  New York 5, N. Y.

INCO NICKEL

NICKEL MAKES STEELS PERFORM BETTER LONGER

Check 4128 opposite last page.

CURRENT LITERATURE

Process Instrumentation and Laboratory Apparatus

Liquid-level controls utilize magnetic operating principle. Units control level changes from 0.0025" to 150' with multi- or single-stage switching. They are detailed in Liquid-level Controls Cat — Magnetrol, Inc.

Check 4129 opposite last page.

Proportioning pumps incorporate self-contained lubricating system. Simplex models, for capacities to 812 gph at max pressure of 10,000 psi, and duplex models, at double that capacity, are reviewed in Series 200 Pumps Bul — Pump Division, American Meter Company Incorporated.

Check 4130 opposite last page.

Thermocouple connector panels and quick-coupling connectors are combination covered in Bul 23-5 — Thermo Electric Co., Inc.

Check 4131 opposite last page.

Testing thermometers have accuracy to within $\pm 0.5\%$ of full scale over entire range. They are unaffected by over- and under-temperatures to 50% of range. Thermometers are reviewed in Testing Thermometers 2261 Bul — Weston Instruments Division, Daystrom, Incorporated.

Check 4132 opposite last page.



"This tank's about ready to be moved, George. Where's that dolly?"

Gordon and Johnson, American-Marietta Co.

CURRENT LITERATURE

Microbiological equipment, including water stills, sterilizers, continuous culture apparatus, dry boxes, freeze dry apparatus and germ-free-life apparatus, is reviewed in Microbiological Equipment Bul — Scientific and Industrial Department, American Sterilizer.

Check 4133 opposite last page.

High-pressure gages are depicted in High-pressure Gages Cat — Strahman Valves, Inc.

Check 4134 opposite last page.

Material Handling

Vane-type feeders available in capacity ranges for all normal plant requirements. They can be used as air locks for pressure differentials to 3½ lb and are explained in Feeders Bul — Fuller Company, Subsidiary of General American Transportation Corporation.

Check 4135 opposite last page.

Scales in wide variety of types are featured in Cat 2001 — Toledo Scale, Division of Toledo Scale Corporation.

Check 4136 opposite last page.

Material-handling equipment is covered in four publications. Conveyor-elevators (358), zipper-type conveyor-elevators (349), belt conveyors, and continuous weighers (958) are specified in Buls 358, 349 and 958 and Belt Conveyors Cat — Engineering Division, Stephens-Adamson Mfg. Co.

Check 4137 opposite last page.

Feeders, including constant-weight, volumetric-belt, disc and rotary-pocket types are explained in 12-page Bul 33-E-13 — Hardinge Company, Incorporated.

Check 4138 opposite last page.

Checkweigher handles bags of 25 to 150 lb in motion and detects weight variations as small as 1½ oz or less per 100 lb. Speed is variable to 25 bags/min, depending on size and weight. Unit is reviewed in Bul 3376 — The Exact Weight Scale Co.

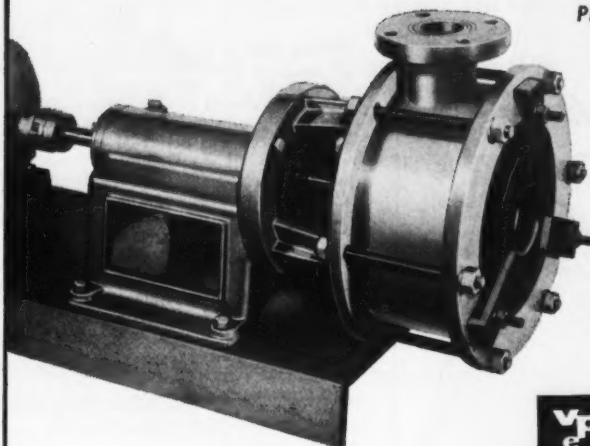
Check 4139 opposite last page.

VALVES MISNOMERED

In the article, "Plug-valve durability scores coke-conveying success" (June CP, p. 154), the plug valves referred to should correctly be called disc-type gate valves. They are product of Everlasting Valve Company.

VANTON CENTRIFUGAL PUMPS IN PVC AND POLYPROPYLENE

TO HANDLE HCl, H₂SO₄, MOST ACIDS,
PLATING SOLUTIONS AND MANY SOLVENTS



Because the wetted parts of these pumps are constructed of unplasticized, unmodified polyvinyl chloride or Polypropylene these pumps offer the broadest possible range of corrosive resistance as well as the non-contaminating transfer of sensitive solutions.

Vanton Centrifugal pumps which are available in a broad range of sizes have capacities of 10 through 180 GPM; discharge heads to 160 feet and are lower in cost than many special alloy pumps for similar applications.

These pumps are ruggedly constructed, are engineered for efficiency and have mechanical shaft seals of the latest design in a range of materials to cover all corrosive applications and deliver top, low-maintenance performance in all applications. **WRITE FOR SPECIFICATIONS INFORMATION.**



Vanton PUMP & EQUIPMENT CORP.

DIVISION OF COOPER ALLOY CORP., HILLSIDE, N. J.

Check 4140 opposite last page.



WHO SWIPED PAGE 43?

D'ja ever pick up a copy of CHEMICAL PROCESSING with an article torn out . . . or even worse, HALF an article torn out?

It's liable to happen when copies are routed around your plant.

You can avoid this annoyance by getting your own copy of CHEMICAL PROCESSING each month. It's easy and there is no charge. Just fill in the subscription request form opposite the inside back cover.



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- ☐ in tanks, tank cars
- ☐ in underground manholes
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- ☐ to stir up stagnant air wherever men are working or material is drying

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COPPUS BLOWERS

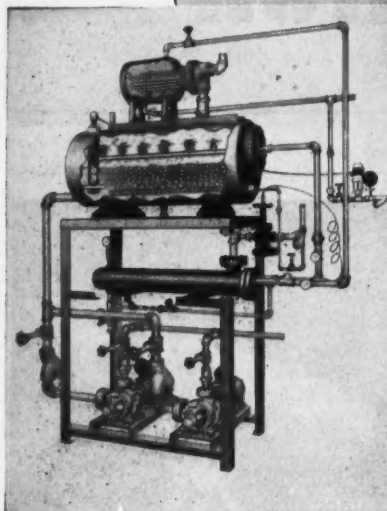
Check 4141 opposite last page.

ONLY with SCHAUB can you guarantee—

From the office of
THE PRESIDENT

*—continuous boiler feed water
deaeration under .005% liter
without vent loss or adjust-
ment, over a 10-to-1 load swing
without sodium sulphite*

F. Schaub



Day-in-day-out under boiler load swings as great as 10-to-1—not just under favorable fixed test conditions.

Excellent thermal efficiency (insignificant steam vent loss) under all regular operating conditions—with no vent adjustment for any load change.

No need for sodium sulphite or other additives. (If you need 'em, you just aren't getting full mechanical deaeration).

Plus at least 6 other savings in operations, maintenance and installation.

All are the result of the unique, but 15-year proved, Schaub design for external superheating, explosive flashdown and fully-vented operation.

SCHAUB ZERO-OXYGEN deaerators

GET THE FULL FACTS—SEE YOUR SCHAUB REPRESENTATIVE OR SEND FOR BULLETIN 575. EITHER WAY YOU WILL PROBABLY CHANGE YOUR IDEAS ON WHAT CONSTITUTES TRUE DEAERATION OF BOILER FEED WATER.

FRED H. SCHAUB ENGINEERING COMPANY

2112 S. Marshall Boulevard, Chicago 23, Illinois

CLIP AND ATTACH TO YOUR LETTERHEAD

Please send my personal copy of Bulletin 575

Name _____

Check 4142 opposite last page.

CURRENT LITERATURE

Corrosion Control

Penton pipe is available in sizes of ½ to 2" in Schedules 40 or 80 and lengths to 20'. Penton-lined steel pipe is produced in sizes one to six inches IPS outside diam, in lengths to 10'. Both are reviewed in Penton Pipe Bul — Cellulose Products Department, Hercules Powder Company Incorporated.

Check 4143 opposite last page.

Fluoroflex-T (proprietary Teflon product) in various products, including pipe, packing, tube protectors, hose and bellows joints, is subject of Fluoroflex-T Bul — Resistoflex Corporation.

Check 4144 opposite last page.

Diaphragm valves are rubber- or plastic-lined in cast-iron or solid-plastic bodies. They are available in sizes of ½ to 6" and detailed in Diaphragm Valves Bul — American Hard Rubber Company, Division of Amerace Corporation.

Check 4145 opposite last page.

Relief valve incorporates full-lift design for immediate and positive relief when set pressure is reached. Designed for corrosive service, valve topworks are isolated from process stream by Teflon diaphragm. Valve is explained in Bul 357-2 — Milton Roy Company.

Check 4146 opposite last page.

Corrosion resistance is offered by hard-rubber casing and impeller and Hastelloy-C shaft of pump. The 80-gpm model is specified in Bul CE-55 — American Hard Rubber Company, Division of Amerace Corporation.

Check 4147 opposite last page.

Ventilating equipment for use in corrosive atmospheres is pictured in four-page bulletin including performance data table on fiberglass belt-driven duct fans. Corrosive Ventilating Bul — Hartzell Propeller Fan Company, Division of Castle Hills Corp.

Check 4148 opposite last page.

Epoxy-resin-reinforced pipe has body of woven-glass fibers. Corrosion-resistant tube and pipe of this material is explained in Fibercast Tube and Pipe Bul — Fibercast Company, Division of Youngstown Sheet and Tube Company.

Check 4149 opposite last page.

Protection against corrosion from ravages of weather, salt spray, sulfur fumes and hot acids at temperatures to 600°F, is provided by protective coatings which are expanded upon in Protective Coatings Bul — Markal Company.

Check 4150 opposite last page.

Plastic tape for corrosion protection of pipe can be stretched to conform to odd shapes or irregular surfaces. Tape is specified in Plastic Tape Bul — Minnesota Mining and Manufacturing Company.

Check 4151 opposite last page.

Rigid PVC Schedules 40, 80 and 120, ½ to 4" pipe; threaded or socket-weld fittings and valves are detailed in Bul CE-56 — American Hard Rubber Company, Division of Amerace Corporation.

Check 4152 opposite last page.

Porcelain valves of Y and Angle types are available in ½ to 6" sizes. Valves are topic of Cat 567 — Process Equipment Division, Lapp Insulator Co., Inc.

Check 4153 opposite last page.

High-impact rubber-plastic pipe, screw or solvent-welded fittings and valves are reviewed in Bul 80A — American Hard Rubber Company, Division of Amerace Corporation.

Check 4154 opposite last page.



"Yes sir! I've noticed my check has been getting larger—but the figures are getting smaller."

Improved FEL-PRO
"HI-TEMP" ANTI-SEIZE
C5-A THREAD COMPOUND

delivers MORE dollar value at same LOW COST!

All These New Improvements—
NEW • Lower breaking and running torque
NEW • Non-settling, non-hardening, homogenized composition
NEW • Can be used in below freezing weather
NEW • Increased lubricating and sealing qualities
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Now in tubes and cans

FREE TEST SAMPLE PROVES HOW!

You'll save countless man hours and avoid costly replacement of broken studs, bolts, etc., with the protective cushioning action provided by the colloidal copper composition of C5-A. Improved C5-A Lubricates and Seals for fast, easy application and removal. Gives same protective performance even after high-pressure, high-temperature use, up to 1800° F. Can be used on all metals and plastics.

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- ✓ Ends seizing and galling even up to 1800° F.
- ✓ Reduces wrench torque
- ✓ Stops needless stud breakage
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- ✓ Speeds assembly and disassembly
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TRY C5-A NOW...

In chemical plants, you'll find C5-A used to protect hot pump studs, autoclaves, reactors, crackers, heat exchangers, etc. Write for your free test sample today!

Check 4155 opposite last page.

CURRENT LITERATURE

Hypalon coatings are specified in Gaco H-2 Hypalon Bul — Gates Engineering Co.

Check 4157 opposite last page.

Resurfacing corroded concrete is task of spray-on formulation explained in Penntrowel® Bul — Pennsalt Chemicals Corporation.

Check 4158 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Pyrex pipe's role in resisting corrosive materials is topic of Bul PE-3 — Corning Glass Works.

Check 4159 opposite last page.

Sealless plastic pumps have capacities of 1/3 to 40 GPM with discharge pressures to 60 psi. Good for temperature range of -60 to 400°F. Pumps are further specified in Sealless Plastic Pumps Bul — Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp.

Check 4160 opposite last page.

Corrosion-resistant fittings, for pipe in stainless steel, aluminum and other special alloys, are inventoried in Speedline® Fittings Cat — Horace T. Potts Company.

Check 4161 opposite last page.

Centrifugal pumps, in UPVC- and polypropylene-constructed wetted parts, are available in capacities of 10 through 180 gpm and discharge heads to 160'. Pumps are expanded upon in Plastic Centrifugal Pumps Bul — Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp.

Check 4162 opposite last page.

Oil-soluble corrosion inhibitor is specified in Tech Data Sheet 3A — Industrial Chemicals Department, Commercial Solvents Corporation.

Check 4163 opposite last page.

Shaft seal for corrosive service is made of Teflon. It can be operated to 250°F and is available in shaft sizes of 3/8 to 3". Further details are incorporated in Bul S-233 — Crane Packing Company.

Check 4164 opposite last page.

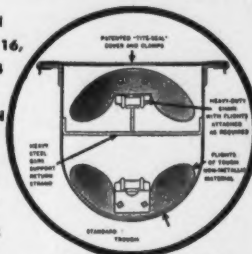
Possesses a Combination of Engineering Efficiencies That Make it Great!

Super-flo
 TRADE MARK
CONVEYOR

CONVEYS SMOOTHLY — EFFORTLESSLY AND WITH POSITIVE PULL

A Super-Flo Conveyor operates within a single "U" Shaped Trough, handling material horizontally or up an incline without transferring to another conveyor. Its action is gentle despite its high capacity... no crowding, chopping or choking. Degradation is at a minimum. Works tirelessly! Flights are a special non-metallic, non-breakable material needing no reinforcement at the chain. Flights conform to contour of trough exerting a wiping action that keeps trough clean.

AVAILABLE IN
 6, 9, 12, 14, 16,
 18, 20 and 24
 in. TROUGH
 WIDTHS — IN
 REGULAR OR
 HEAVY-DUTY
 STEEL, STAIN-
 LESS OR
 NON-FERROUS
 METALS



U.S. and Foreign Patents Pending.

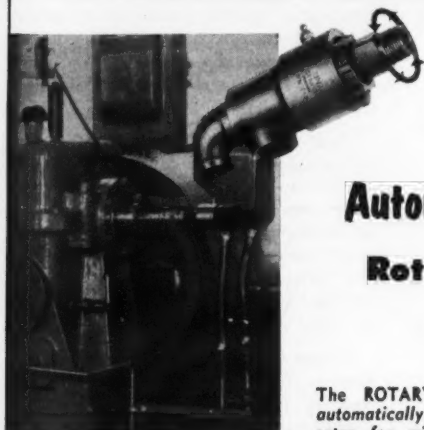
Discharges at any required location, hand, rack and pinion or air operated. Trough is completely enclosed with "Hammond Tite-Seal" Cover and Clamps for easy access.

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 For
 Bulletin
 SF-659-A
 Today



Check 4165 opposite last page.

The ROTARY UNION*



**The
 Automatic
 Rotating
 Seal**

The ROTARY UNION automatically compensates for misalignment

and wear, and automatically adjusts to variations in line pressure. Because it maintains its precision mechanical seal at all times, it outperforms and outlasts all similar equipment, and saves you money.

Over 40 standard types and sizes of ROTARY UNIONS cover almost every application where rotating equipment must be heated or cooled. Pipe sizes 1/4" through 5".

Write for Bulletin 700.

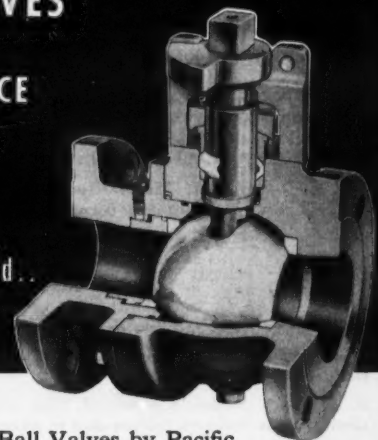
*Trade Name - Patented

"WHERE Good Connections COUNT"
PERFECTING SERVICE COMPANY, 332 Atando Ave., Charlotte, N.C.
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 New York — Providence — Montreal — Toronto

Check 4156 opposite last page.

**BALL VALVES
 PACIFIC'S
 PERFORMANCE
 PACESETTER**

Bubble-tight
 Shut-offs...
 Two-way Flow...
 Compact, Rugged...
 Quarter-turn...
 Fast-acting



NOW! A

complete line of Ball Valves by Pacific Valves for general purpose, abrasive and corrosive service...from vacuum to 1000 psi...solid Teflon stem packing with simple take-up adjustments...adjustable compression on ball-seals...standard body materials include cast iron, ductile iron, carbon steel, type 316, type 304, Alloy 20 and Monel. Seal matl.: Viton, Buna-N, Neoprene, Kel-F, Teflon and Nylon. 150 lb. Flgd. Ends: 1/2" to 10"; Scrld. 1/4" to 2". Send for Pacific's Ball Valve Cat. BV-60.



PACIFIC VALVES, INC.
 32nd and Walnut, Long Beach 7, Calif.

Check 4166 opposite last page.

Look into Lonerger Bellows Valves



Seven exclusive features reduce maintenance costs; provide increased valve versatility.

Like all bellows valves, Lonerger valves are designed to keep corrosive or viscous fluids away from working parts. In addition, they provide a balancing action against a variable back pressure. The similarity between Lonerger and any other bellows valve ends there. *Only Lonerger valves provide:*



1. *Saf-T-Alarm to warn of bellows failure. Alarm may be remotely located. (Optional at extra cost.)
2. Complete interchangeability with conventional valves of the same series.
3. Versatile cap arrangement. Bolted cap is standard and is interchangeable with a packed cap without taking the valve off the line or out of service. Gag facility is included.
4. *Simplified nozzle replacement due to an exclusive knockout feature. (Optional.)
5. A Hydro model; a patented, true, non-chattering liquid valve. Elimination of chatter ends bellows failure due to excessive flexing.
6. Reserve seating surface obtained from a built-in spare disc.
7. PVC trim, where pressure-temperature conditions permit.

These seven features mean economy for Lonerger valve users—in first cost; in operation; in maintenance. If your plant uses bellows valves, then it will pay you to investigate Lonerger. Series DB bellows valves are described in a new bulletin. Series D valves, available without the bellows, are also described. Write for your copy today.

*Patent Pending

Lonerger

J. E. LONERGER COMPANY, 203 RACE STREET
PHILADELPHIA 6, PENNA. • SINCE 1872



Check 4167 opposite last page.

CURRENT LITERATURE

Protective coatings for corrosion resistance are specified in booklet which contains application details and performance data. Tygon Data Book — Plastics and Synthetics Division, U. S. Stoneware.

Check 4168 opposite last page.

Corrosion-resistant valves of globe, gate and check types are presented in Valve 2474BSW, Valve 6003SS and Valve 2345 Buls, respectively — The Wm. Powell Company.

Check 4169 opposite last page.

Valves

Globe and angle valves of screwed and flanged types are tabulated in four-page Bul L-475 — The Bastian-Blessing Company.

Check 4170 opposite last page.

Check valves (654), pressure-loss tests (659) and cause, effect and control of water hammer (851) are topics up for discussion in Buls 654, 659 and 851 — The Williams Gauge Co., Inc.

Check 4171 opposite last page.

Valves with Teflon-coated plugs are designed for use where infrequent or inadequate plug lubrication might be expected. Information on these valves is incorporated in Bul V-614 — Rockwell Manufacturing Co.

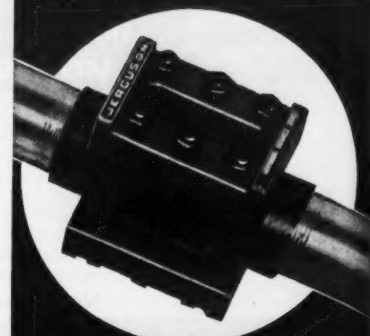
Check 4172 opposite last page.



"I'd like you to meet the safety engineer's new secretary."

J. V. Johnson & R. Gordon
American-Marietta Co.

NEW . . . Jerguson Sight Flow Indicators



easily and inexpensively
installed to show movement
of liquid in pipe lines

Here is a new line of Sight Flow Indicators . . . easily and inexpensively installed in any new or existing pipe line 1/2" to 2" N.P.T.

The special design of these new indicators results in a turbulence in the flow of liquid, making it easily visible. Several types of indicating vanes, installed within the chamber, may also be furnished, according to variable conditions of rate of flow and viscosity of liquid. For indication of minute flows, small Sight Flow Indicators with a rotating vertical rising ball are available.

Jerguson Sight Flow Indicators are soundly designed, carefully made, and are backed up by a company with over 40 years experience in the field. Available in Transparent and Reflex types, in a wide variety of materials and linings, and with Wedge Type Illuminators, Havg Chambers, Non-Frosting Glasses, or other special construction.

If you have a problem of viewing the flow of liquid in a pipe line, it will pay you to investigate the new Jerguson Sight Flow Indicators today. Send us your requirements or write for Data Unit.

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Observation of Liquids and Levels

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Pétrole Service, Paris, France

Check 4173 opposite last page.

CHEMICAL PROCESSING

SARCO

Here are 7 Sound Reasons
Why the **Thermo-Dynamic**
Does a Better Job of Trapping



1. **Simplicity**—has only one moving part. 2. **Maintenance**—practically zero. 3. **Wide pressure range**—one trap for all pressures from 10 to 600 psi. 4. **Uniform performance**—operates equally well on heavy, light, or no condensate load. 5. **Operates against back pressure**—up to 50% of inlet pressure. 6. **Rugged**—unaffected by superheat, water hammer, vibration, or corrosive condensate. 7. **Minimizes inventory** of spare parts.

Maintenance Time: 40 Seconds. If it now takes your maintenance crew more than a couple of minutes to service an ordinary trap, you're throwing away valuable time. This Sarco Thermo-Dynamic can be cleaned, blown out if necessary, and reassembled on the line in as little as 40 seconds.

For Prompt Information on the TD-50 . . . or for fast help on the efficient solution of any steam trapping problems, get in touch with a SARCO District Office, Sales Representative, or Distributor. (There's one near you.)

Only SARCO makes all 5 types:
Thermo-Dynamic • Thermostatic • Liquid Expansion • Float Thermo-static • Inverted Bucket

*U.S. Pat. No. 2,817,353

TM Reg. U.S. Pat. Off. 1409



Check 4174 opposite last page.

AUGUST 1960

CURRENT LITERATURE

Gate valves incorporate separate disc faces, connected by axle-like unit. This joins two seating faces, while providing flexibility for faces to seat tightly with independent action. Valves are inventoried in Flex Gates Bul — Industrial Products Group, Crane Company.

Check 4175 opposite last page.

Safety

Portable ventilators are adaptable to practically any fresh-air requirement in industry. Ventilators are subject of Vano Ventilators Bul — Coppus Engineering Corp.

Check 4176 opposite last page.

Protective clothing, including coats, aprons, overalls, gloves, boots, shoes and rubbers, is inventoried in protective Clothing Bul — Mills and Export Division, Goodall Rubber Company.

Check 4177 opposite last page.

Explosion-proof 90° roller elbows provide roll-through lead-in wiring for motors, panel boards, circuit breakers and similar equipment. They are considered in Roller Elbows Bul — Appleton Electric Company.

Check 4178 opposite last page.

Protective wet-weather clothing features seams which are sealed by electronic welding. The PVC clothing is considered in Protective Clothing Bul — Jomac Inc.

Check 4179 opposite last page.

Switches incorporate visible-blade construction to easily show whether or not switches are open. These are considered in Safety Switch bul — Square D Company.

Check 4180 opposite last page.

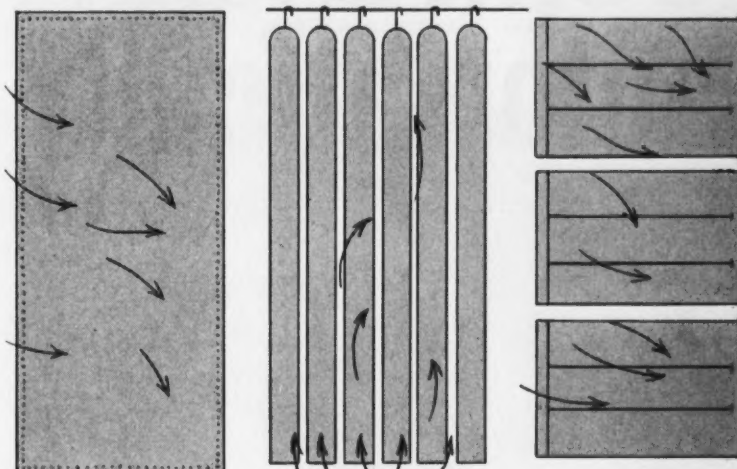
Plant Engineering and Maintenance

Handy engineering-data tables are contained in eight-page pamphlet, which includes information on weights and specific gravities, engineering constants, steam coils in storage tanks, short-cut engineering conversion factors, steam tables, ampere ratings for induction motors, and torque and hp equivalents, among others. Engineering Reference Pamphlet — The Falcon Manufacturing Division, First Machinery Corp., Inc.

Check 4181 opposite last page.



SLY DUST FILTERS For LONG BAG LIFE



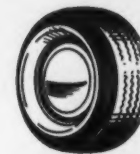
1900's
**SLY DUST
ARRESTER**

Cloth screens on wood frames were rigidly fastened to the dust arrester case, causing strain and excessive wear.



1930's
**SLY TUBE-TYPE
FILTER**

Certain areas of cloth tubes, particularly around the cuffs, bore the brunt of incoming dust-laden air, leading to premature failure. Shaking device also contributed to wear.



**TODAY
NEW SLY
"ROLL-CLEAN"
DYNACLONE®**

"Resist-O-Wear" filter bags have 3-section design for greater strength. Spacer weight is distributed on 3 seams. Bags are cleaned by reverse air.

New Dynaclone Filter Bags Provide 2 to 3 Times Longer Life

New SLY "Resist-O-Wear" bags (patent pending) far outlast other types, as proved on the most demanding applications. In addition to basic bag strength, Dynaclone construction and low-velocity design insures even distribution of dust-laden air over the entire cloth area . . . there is no dust concentration at certain points. Dust is removed automatically by reverse cleaning air—no shaking, no abrasion.

The Dynaclone operates continuously, 24 hours a day if required. Uniform, constant suction at dust sources results in complete dust collection.

Sly Dust Filters provide 20 to 40% more cloth in a given space than any other type. Space saved means lower installation costs, simplified piping and ductwork.

There are more than 40,000 Sly Dust Filters in use, including over 1,000 Dynaclones. Investigate their advantages on your applications . . .

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4754 Train Avenue • Cleveland 1, Ohio • Offices in Principal Cities • Overseas Licensees:
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Check 4182 opposite last page.

DECOLORIZING, PURIFYING CORN SYRUP automatically



VALLEZ ROTATING LEAF PRESSURE FILTER

These Vallez rotating leaf pressure filters were designed specifically for removing color and purifying corn syrup. The complete filter element is all stainless steel type 316 construction, with special nylon filter cloth. The filters can be completely controlled by automation.

Write for complete detailed information on this and other G-B process equipment.

See our catalog in Chemical Engineering Catalog.



GOSLIN-BIRMINGHAM MANUFACTURING CO., INC.

P. O. BOX 631 BIRMINGHAM, ALABAMA
FILTERS • EVAPORATORS • PROCESS
EQUIPMENT • CONTRACT MANUFACTURING
including HEAVY CASTINGS

Check 4183 opposite last page.

CURRENT LITERATURE

Butyl-rubber properties are graphed in four-page bulletin featuring this shock-absorbing rubber. Butyl Rubber Bul — Enjay Chemical Company, Division of Humble Oil & Refining Company.

Check 4184 opposite last page.

Sight flow indicators can be installed in any new or existing pipe of 1/2" to 2" NPT. They are presented in Sight Flow Indicators Data — Jerguson Gage & Valve Company.

Check 4185 opposite last page.

Tube-maintenance tools, including condenser cleaner, tube-expansion control and internal tube cutters are explained in Tube-maintenance Tools Bul — Airetool Manufacturing Co.

Check 4186 opposite last page.

Flaring-tool line incorporates design having one integral unit. Feed releases automatically when flare is fully formed. Reversing feed screw burnishes flare. Tools are depicted in Flaring Tools Bul — The Ridge Tool Company.

Check 4187 opposite last page.

Graphic operations picture in color is given by visual control board which is reviewed in 24-page Boardmaster Booklet — Graphic Systems.

Check 4188 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Worm-gear drives are rated to latest AGMA standards. Illustrations and descriptions of these drives are included in Cat HGB — Foote Bros. Gear and Machine Corporation.

Check 4189 opposite last page.

Air compressors are treated in 44-page bulletin which pictures and describes various details of units. Bul M-81 — The Cooper-Bessemer Corporation.

Check 4190 opposite last page.

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Check 4191 opposite last page.

CHEMICAL PROCESSING

CURRENT LITERATURE

Broken factory floors can be repaired without traffic tie-up by use of instant-setting concrete patch. This is considered Instant-Use Brochure — Flexrock Company.

Check 4192 opposite last page.

Dicalite® filler material, including diatomite, perlite and carbon-based types, are available for wide range of filler applications. They are specified in Dicalite Fillers Bul — Dicalite® Department, Great Lakes Carbon Corporation.

Check 4193 opposite last page.

Insulation maintenance for variety of situations is discussed in Insulation Maintenance Bul — Benjamin Foster Co., Division of Amchem Products, Inc.

Check 4194 opposite last page.

Bourdon tubes of 316 stainless steel has operating ranges of 30" vac to 75 psig, 10 to 100 psig, 30 to 400 psig, 75 to 800 psig, and 100 to 1000 psig. They are delineated in Bul 019 — The Mercoid Corporation.

Check 4195 opposite last page.

V-Belt drives are discussed in V-Belt-drive Design Bul — The Gates Rubber Company.

Check 4196 opposite last page.

Conveying

Vibrating conveyors are capable of handling tonnage in sizes of five microns to large lumps and materials of various moisture contents. Made in 3 ft lengths and over, they are subject of Lo-Veyors Bul — Ajax Flexible Coupling Co., Inc.

Check 4197 opposite last page.

Tubular conveyors, which are completely flexible, self-cleaning and self-supporting, are reviewed in conveyors Fact-Finding Report — Conveyor Div., Hapman Corp.

Check 4198 opposite last page.

Metal-mesh belts for various conveying applications are featured in 130-page Reference Manual — The Cambridge Wire Cloth Co.

Check 4199 opposite last page.



Transfer Many Thermocouples

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Connector Panels T-E has one for your exact needs. These panels provide flexible, centralized control in transferring any number of thermocouples to indicating, multi-point recording and controlling pyrometers. Ideal for patch panel use, they are available in many compact shapes and sizes — with interchangeable plugs and jacks in I-C, C-C, and C-A. A panel for 48 thermocouples and 16 pyrometers measures only 13 1/4" x 7 1/2". Polarity markings and screw-fastened connections make wiring easy.

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Thermo Electric Co. Inc.
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In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

Check 4200 opposite last page.

To Manufacturers of Plastic Compounds...



FIG. G-142

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Check 4202 opposite last page.

CURRENT LITERATURE

Pneumatic conveying is discussed in Airstream Conveyors Bul — Dracco Division, Fuller Company, Subsidiary of General American Transportation Corporation.

Check 4203 opposite last page.

Vibrating conveyors and feeders are reviewed in Vibrating Conveyors Bul — The Cleveland Vibrator Co.

Check 4204 opposite last page.

Sectional belt conveyors of pre-built type are considered in Cat 2779 — Link-Belt Company.

Check 4205 opposite last page.

Chemical Materials

Variety of starches is reviewed in Starches Bul — National Starch and Chemical Corporation.

Check 4206 opposite last page.

Bromine properties are highlighted in Bromine Bul — The Dow Chemical Company.

Check 4207 opposite last page.

Fluorolubes (addition polymers of trifluorovinyl chloride), sulfur dichloride and lauryl mercaptan properties are outlined in Fluorolube Data File and Sulfur Dichloride and Lauryl Mercaptan Data Sheets — Hooker Chemical Corporation.

Check 4208 opposite last page.

Succinic-anhydride physical properties, important reactions, infrared-absorption spectrogram, suggested uses, and bibliography of 302 references are all included in 40-page Tech Bul I-11 — National Aniline Division, Allied Chemical Corporation.

Check 4209 opposite last page.

Plasticizers are available in 15 types for various purposes. For example, one is used for polyvinyl-butyl interlayer in safety glass. This increases adhesion and eliminates need for edge sealing. Plasticizers are specified in Plasticizers Bul — Union Carbide Chemicals Company, Division of Union Carbide Corporation.

Check 4210 opposite last page.

Methanol can be used to reduce manufacturing and processing costs. This story is outlined in Bul S-03-06 — Celanese Chemical Company, Division of Celanese Corporation of America.

Check 4211 opposite last page.

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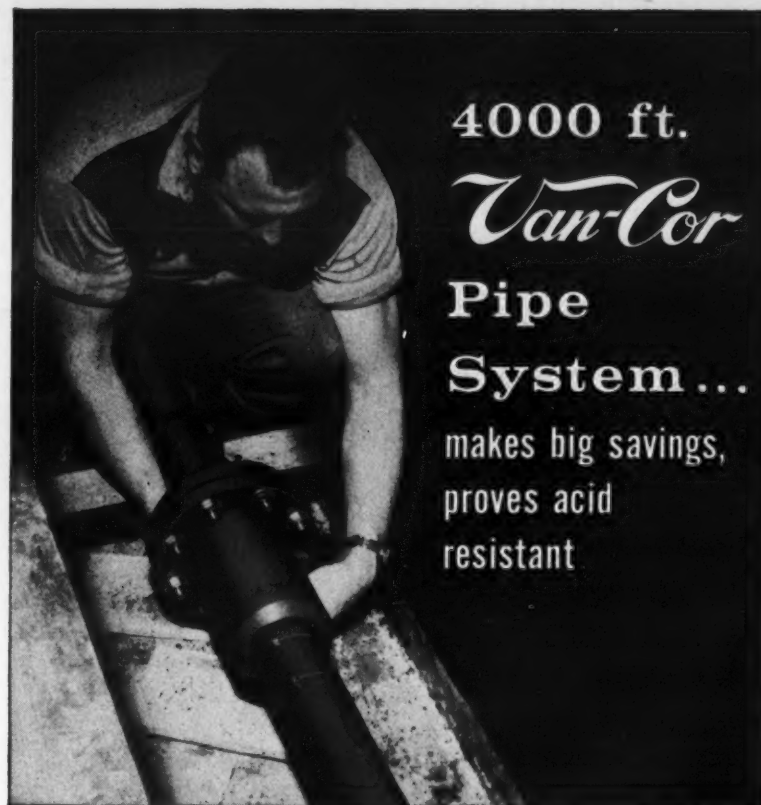
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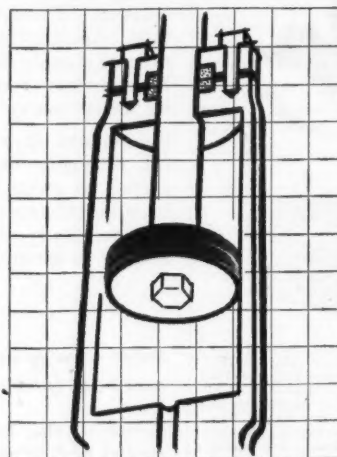
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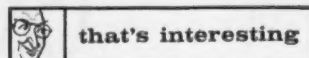
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Check 4216 opposite last page.



Thought-provoking slants on projects and products

Nature's nitrogen-fixing secret pried loose

Long-secret reaction which nature uses within a living cell to create nitrogen compounds essential to life has been pried loose by researchers in E. I. du Pont de Nemours and Company, Inc., fundamental research laboratories.

In the past scientists have generally believed that this work is performed by enzymes, but detailed study of the enzymes has been blocked because researchers could not extract them from living cells without destroying them.

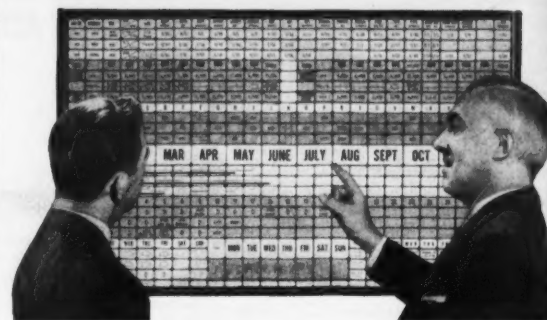
This barrier has been overcome by breaking open living cells of selected bacteria and extracting the enzymes under precisely controlled conditions. A chemical fuel — pyruvic acid — provides necessary energy for the nitrogen-fixing reaction. Extracted enzymes then consistently carry out process outside the cell bodies. Experiments were facilitated by using "heavy" nitrogen.

Subsequent study of biological nitrogen fixation is expected to eventually increase farming efficiency. It may also advance study of catalytic reactions in general.

Solar energy may light and heat future homes

House of the future may be heated and lighted by energy of the sun stored in its walls, according to William F. Drees, research vice president of Formica Corporation, subsidiary of American Cyanamid Company. Mr. Drees said that his company is exploring long-range possibilities of developing decorative wall panel capable of being energized during the day, acting as a storage battery and releasing this energy in light and heat at night.

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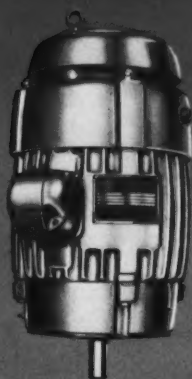
Chemistry will be taught with 160 30-minute films in six Wetzel county, West Virginia, high schools this year.

Teacher will be Dr. John F. Baxter of University of Florida and Continental Classroom, television series sponsored by Pittsburgh Plate Glass, parent company of Columbia-Southern Chemical Corporation which is cooperating with the Wetzel county board of education and the federal government in financing the series.

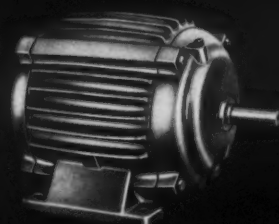
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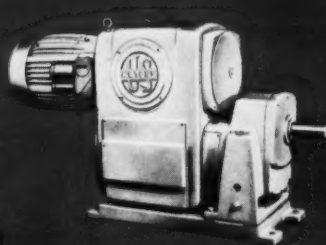


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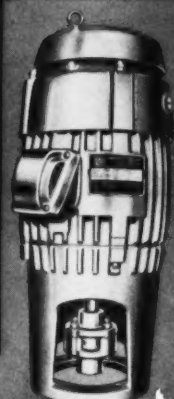


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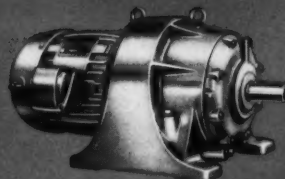
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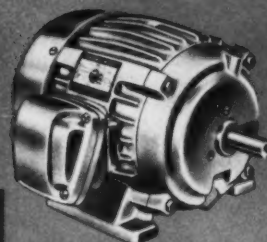
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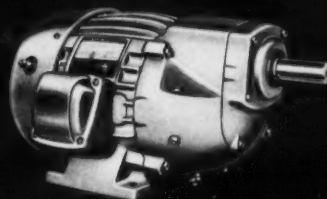
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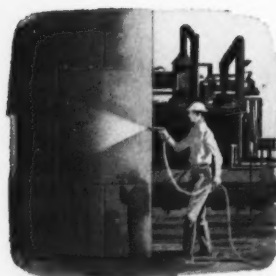
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